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Contents

Small Car Problems Revived by Austin. By Leslie Peat	109
Packard Offers Speedster Series With Shorter Wheelbase. By Athel F. Denham	111
Knock Test Apparatus and Methods Are Standardized by Michigan Engineering Experiment Station. By Dr. George Granger Brown	112
Accuracy, Speed and Operating Costs of Machine Tools Help Determine Service Value. By Joseph Geschelin	116
Just Among Ourselves	118
Similarity in Body Lines Confuses the Public. By W. Clayton Hill	119
Junkers Develops Diesel Engine for Aircraft Use. By Edwin P. A. Heinze	121
Federal Adds Six Truck Models to Complete 1930 Line	123
Painted Plant Interiors Promote Automotive Production Efficiency When Specific Requirements Are Closely Surveyed. By T. J. Maloney	124
S.A.E. Standards Report Adopted With Few Changes	129
New Developments	132
News of the Industry	135
Financial Notes	139
Men of the Industry	140
Calendar of Events	144
Advertisers' Index	114, 115

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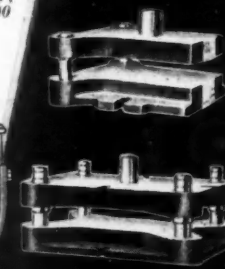
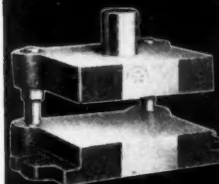
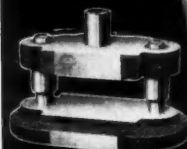


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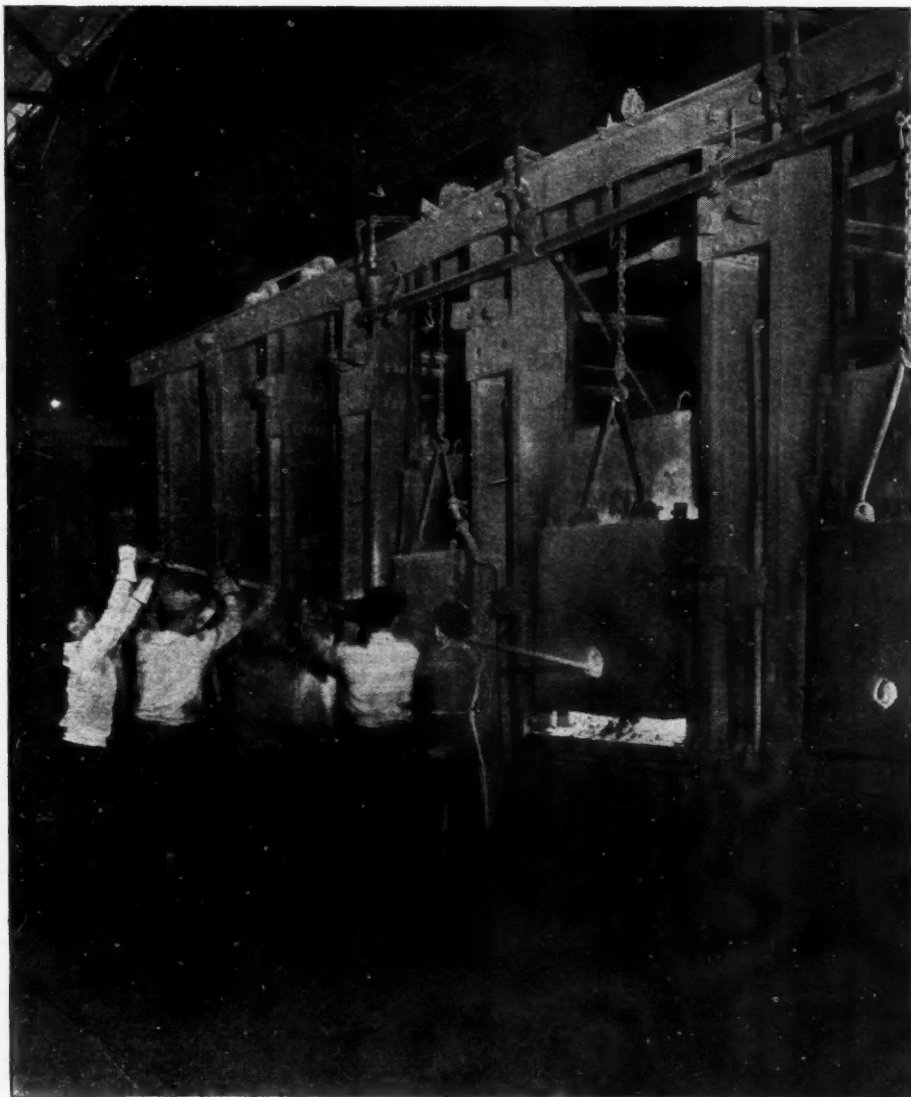
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Small Car Marketing Problems Revived by Austin

Claims of economical operation, low production cost and purchase price, as compared with Ford and Chevrolet, may challenge worth of the American trend toward bigger models.

By LESLIE PEAT

WITH the showing of the American Austin Seven at the National Automobile Show in New York, the question of this continent's attitude toward the small car was again raised. Two other American small cars have been proposed during last year, namely, the James V. Martin unit and the Littlemac. The former has been experimentally built at Long Island City by an able airplane engineer and the other saw the light of day at Muscatine, Iowa, a few months ago.

Although the body of the Austin exhibited at the New York Show follows American lines, its chassis is a replica of the British design. It has a 75-in. wheelbase, a four-cylinder powerplant of L-head design with a 2 13/64-in. bore and a 3-in. stroke. It is rated at 7 hp., and has an output of 12 hp. at 2400 r.p.m.

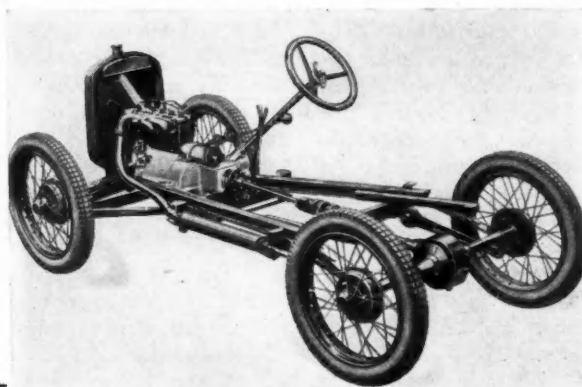
The coupe model weighed about 1100 lb. as compared with 2216 lb. for the Ford coupe and 2400 lb. for the Chevrolet coupe. This comparison shows the advantage the Austin manufacturers may have in first cost. The relatively light weight of the

small car is perhaps the primary reason why it would be possible to build a car of this type in quantities that are small in comparison with Ford and Chevrolet production, and which yet could be sold initially for less than either of these cars. If the small car gains wide public acceptance and hence gets into big quantity production, prices that are very much lower than Ford would be possible, because the small car maker would then have the advantage of low total material cost, plus something approaching minimum labor costs. The selling cost may take a larger percentage of the small car list than is the case with Ford or Chevrolet.

On the other hand, as a generality, the industry's previous experience has indicated that the lower the list price the smaller the percentage of selling cost.

This is generally true so far as dealers' discounts are concerned, as the higher-priced cars usually carry slightly higher discounts than the lower-priced ones.

The experienced American production men involved in the Austin operation claim that this particular car can be produced and sold at a profit for a price of less than \$450 in quantities of 35,000 or more. Assuming the cor-



Chassis of British Austin "7." Engine is a four-cylinder L-head with 2 13/64-in. bore and 3-in. stroke

Make	Price, F.O.B.	Net Weight	Developed Hp.	Price Per Lb.	Lb. Per Cu. In.	Developed Hp. Per Cu. In.	Lb. Per Developed Hp.
*Austin Coupe	\$450	1,100	12	\$0.41	19.2	.23	83.4
Ford Coupe	490	2,216	40	0.221	11.0	.195	55.5
Chevrolet Coupe	595	2,400	50	0.248	12.3	.258	48.0

* Data are approximate.

rectness of this claim, the whole picture of light car possibilities in the American market assumes a far brighter hue than past calculations have indicated. Moreover, production estimates made by Austin executives indicate plans to produce from 100,000 to 150,000 cars a year.

Measures of Performance

An analysis of measures of performance of the coupe models of the Austin, Ford and Chevrolet is interesting. Taking the Austin, with an approximate weight of 1100 lb., we find that it weighs 66 per cent more per horsepower than does the Ford coupe, and 72 per cent more per horsepower than does the Chevrolet. Another measure of performance is shown in an analysis of the comparative weight per cubic inch of displacement of these automobiles. The Austin weighs 71 per cent and 53 per cent more per cubic inch of displacement than do the Ford and Chevrolet, respectively.

Light weight is important from the standpoint of fuel economy and performance; the lighter the car, the cheaper it is to operate and the less horsepower is required to provide any given standard of performance.

Some of the economy of the European type of small car is due to the fact that they have less power, i. e., poorer performance in relation to weight than our present low-priced automobiles. If it is found to be desirable to step-up the performance of the small car to about the Ford standard, power would have to be increased with the resulting decrease of economy.

It is difficult to make any comparison of the respective fuel economies, inasmuch as that depends largely upon operating conditions, but the average of 40 miles per gallon is generally expected from the European type of small car, as compared with about 20 miles per gallon for our low-priced jobs. Tire and lubrication costs would be lower in the small car. But economy in operation costs often results in decreased performance, and it is a question whether a sacrifice of performance can be effected with any great success in the face of the present trend in this country toward more power. Performance has been established as a sales point by manufacturers of even our lowest-priced automobiles.

Basis of European Trend

The popularity of diminutive cars in Europe is largely based upon the fact that they can be sold at a comparatively small price, have low fuel consumption—motor fuel is expensive abroad—and are not taxed as heavily as cars of larger horsepower. These economies are very important over there because the purchasing power averages much lower than ours and economy of operation has been a paramount consideration of a large percentage of car owners. As a result, the European trend in power and size has been toward smaller displacement and shorter wheelbases. General Motors Corp. has announced that it will produce a car better suited to the European market than any of its present Opel lines and this presumably means one that is lighter than any of its present products. At the same time, the same corporation has been increasing the size and

horsepower of its lines of automobiles in this country.

The present American trend toward larger bodies and longer wheelbases indicates the attitude in this country toward the matter of more leg room, head clearance and ample body design—greater comfort, which cannot generally be found in a diminutive automobile. The American-built body of the Austin coupe shown in New York provides reasonably adequate leg room, however. But many feel that a car to sell in this country should seat four persons. This would be impossible on a 75-in. wheelbase, with the American standards of comfort. A four-passenger car would have to have a 90-in. or possibly a 100-in. wheelbase. This would add weight and reduce economy and performance, unless more power were used, and the use of more power would mean further reduced economy.

Servicing Possibilities

If the Austin cars can be produced in any sizable quantity, independent parts manufacturers will be quick to make replacements for servicing these automobiles. This, together with the factory service program, should

be ample to cope with the maintenance and repair requirements of Austin owners. Parts manufacturers have been ready to embrace any opportunity to produce parts for any cars for which there is a demand. The 40,000 or more independent repair garages throughout the country would be able to secure replacement parts for the Austin cars from parts wholesalers and perform practically any service operation if dealer service were not readily available. The Austin chassis, as shown in New York, offers no unusual servicing problem.

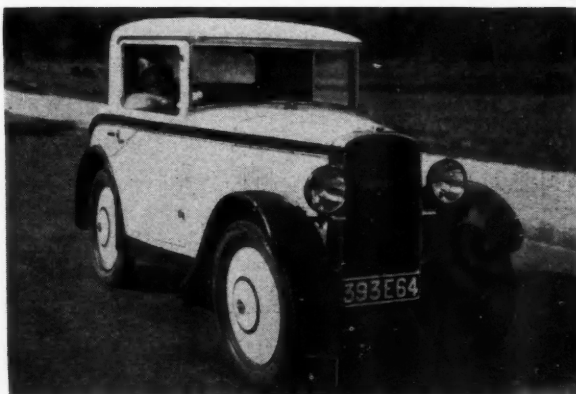
It is probably true that the small car will have to undersell Ford in order to interest the public, because the public is likely to think it is not getting value received if it has to pay as much as, or more than, a Ford for a package that is so much smaller. However, the fact that there are available used cars in running condition selling at prices as low as \$25 to \$50, indicates that the matter of first cost is not standing in the way of anyone who wants to own an automobile. In other words, if they have money enough to buy a small car they also have enough to buy a fairly good used car. So, if the small car brings any new buyers into the market it is likely that one or more of these four factors will be responsible:

One, the buyer insists on having a new car but has not money enough to buy a Ford or a Chevrolet but can afford to buy a small car because of price differential.

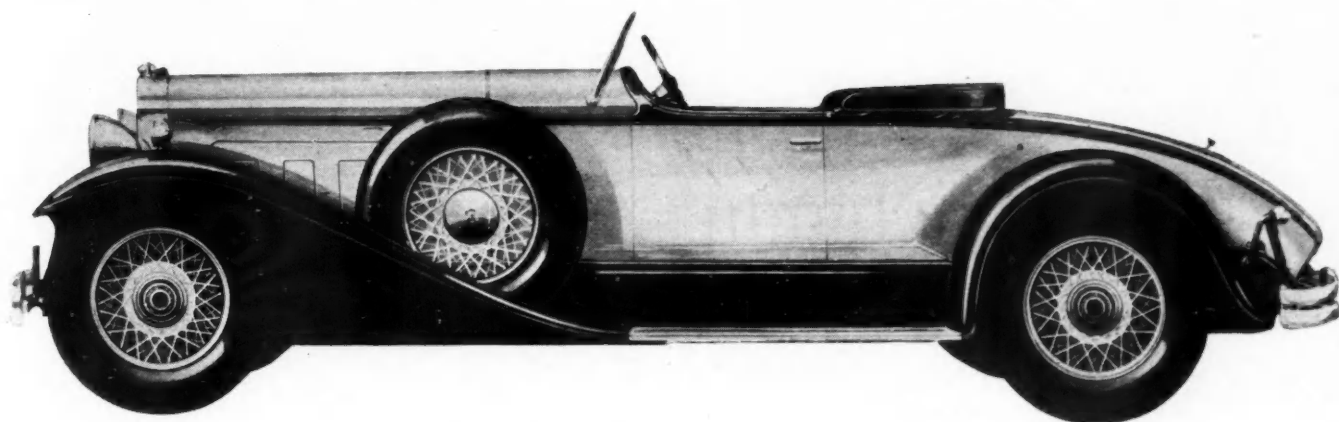
Two, he has sufficient money to buy a used car selling at a price equal to or less than the small car price but because of its higher operating cost cannot afford to run it. The superior operating economy of the small car may make it possible for this class of buyers to own small cars.

Three, the buyer is attracted by the novelty of the new car or its easy handling in traffic.

Four, buyers of fleets—jewelers, florists, etc.—would be attracted by the probable saving in the operation of their delivery units.



Five hp. Rosengart—the French edition of the Austin "7." American small cars of 75 in. wheelbase are likely to have this type of body rather than the sedan type



Packard Speedster runabout on a 134-in. wheelbase

Packard Offers Speedster Series With Shorter Wheelbase

Four body models added to custom eight line are priced at \$5,200 for open types and \$6,000 for closed cars.

By ATHEL F. DENHAM

IN addition to the Custom eight line on the 145½-in. wheelbase, Packard is now also offering a "Speedster" series on this chassis, with a number of mechanical deviations, and special bodies on a 134-in. wheelbase. The series comprises four body styles, a two-passenger runabout with staggered seats, a four-passenger phaeton, a Victoria and a five-passenger sedan. The new series is priced at \$5,200 for open models and \$6,000 for closed types.

The frontal area of the bodies is considerably less than normal. On the open models this is due to a decrease in body width of about 3 in., and fish-tail streamlining, while on the closed body models the overall height has been reduced by shortening the body pillars.

Mechanical changes include the adoption of separate intake and exhaust manifolds, larger exhaust valves, a vacuum pump, lower gear ratios and ribbed brake drums. Two compression ratios are offered with the custom eight engine used in these cars. With the standard compression ratio of 4.85 to 1 and standard spark plugs, the engine delivers 125 hp. at 3400 r.p.m. With

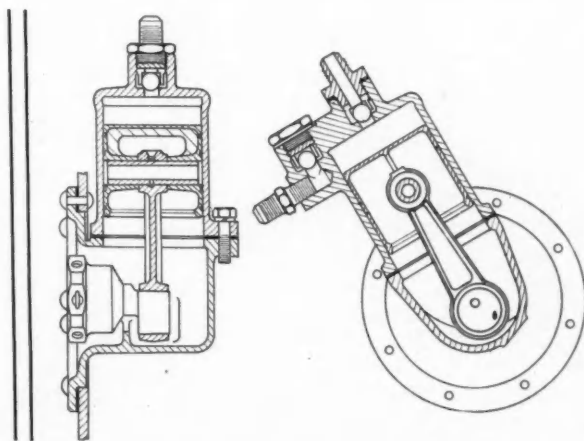
a special head giving the high compression of 6.0 to 1, and using metric plugs, 145 hp. is developed at 3400 r.p.m., according to the Packard Motor Car Co.

As mentioned, the exhaust valves have been increased in size, their new diameter being 1⅝ in., the same as that of the inlet valves. The new inlet manifold is of the dual type, with a dual "Detroit Lubricator" carburetor. There is considerably less heating of the intake riser than in normal Packard design.

The only heat is from the two center ports, with no through passage for the exhaust gases, the connection between these ports and the exhaust manifold being within the cylinder block.

Exhaust manifolds have rear outlets, are rectangular in shape and are ribbed longitudinally on top for cooling. The exhaust pipe is provided with a cut-out which can be operated from the driver's seat.

To assist the manifold vacuum in supplying the fuel to the standard vacuum tank system, a vacuum pump, driven from an eccentric at the forward end of the camshaft, is provided. This pump is composed of a cylinder and ringless piston, and
(Continued on page 120)



Vacuum pump for fuel feed on the Packard Speedster series

Knock Test Apparatus and Methods by Michigan Engineering Experi

Single cylinder variable compression engine used. Next important development is a means of detecting an incipient knock which is independent of the human ear.

AT the present time the knocking tendency of a motor fuel determines to a large extent the commercial value of the product. Unfortunately, there is no standard method for determining the knocking tendency of different fuels, nor any standard method for reporting such a property even when determined. Different companies and laboratories

have adopted their own methods for expressing the knock rating of fuels based on the various methods of test which have proved satisfactory in the different laboratories. Although satisfactory from the standpoint of the individual laboratory, this practice leads to confusion when attempting to purchase motor fuel on knock rating specifications.

For the past two years increasing quantities of motor fuel have been purchased on specified knock ratings as determined in the Engineering Research laboratories of the University of Michigan. These knock ratings have been expressed in terms of the conventional "benzol value," which is defined as the per cent by volume of pure benzene (C_6H_6) that must be blended with straight run Pennsylvania motor fuel to make a product having the same knocking tendency as the fuel under test.

Although these tests were conducted under uniform conditions, carefully selected to give results consistent with knock ratings determined by actual road tests on a number of representative motor cars, the fact that they were based upon an arbitrary and not readily reproducible sample of Pennsylvania motor fuel made correlation with other laboratories difficult. It has been recognized for some time that the only satisfactory solution to this difficulty would be found in the use of two pure compounds to determine the knock-rating scale. Dr. Graham Edgar* deserves most credit for his efforts to supply the industry with such materials. His suggestion of the use of normal heptane (C_7H_{16}) as the standard for the lower end of the scale and iso-octane (tri-methyl-isobutyl methane or 2, 4, 4-tri-methyl-pentane) as the blending material to determine the increasing scale of knock ratings has been adopted by many laboratories, and is occasionally written into specifications for knock ratings. Similar blends of normal heptane with pure benzene (C_6H_6) are widely used in England and also in this country.

Character of Test Materials

The great differences in the physical and combustion characteristics of benzene and normal heptane make these two substances somewhat less satisfactory than iso-octane and heptane as primary standards. This is evident in the different specific gravities and particularly in the fact that the air-fuel ratio giving maximum knock varies from about 13 to 1 in the case of pure heptane to about 11 to 1 for a blend of 90 per cent benzol with 10 per cent heptane, while in the

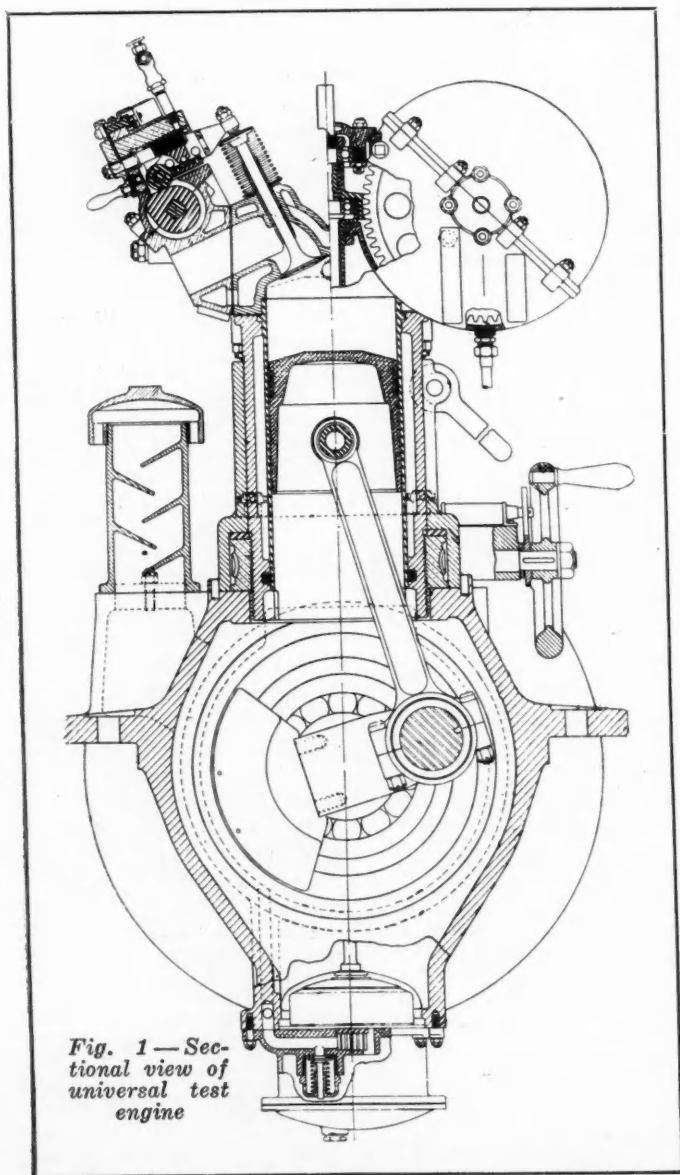


Fig. 1—Sectional view of universal test engine

* Industrial and Engineering Chemistry, Vol. 19, p. 145, January, 1927.

Are Standardized ment Station

By DR. GEORGE GRANGER BROWN

Department of Engineering Research,
University of Michigan

case of the iso-octane-heptane blends no marked changes in gravity are experienced and the air-fuel ratio giving maximum knock is practically constant. However, we have already received samples for test which show a higher knock rating than pure iso-octane. Since it is impossible to extrapolate knock ratings beyond 100 per cent iso-octane, this fact is an important limitation to the use of iso-octane as a primary standard.

Because of the obvious advantages in using a pure compound as the primary standard in determining the scale of knock ratings, all our tests are now reported in terms of relative compression ratio referred to pure normal heptane. In order that the results may be expressed in terms of pure compounds, the knock ratings are also reported in terms of blends of benzene in heptane, and iso-octane in heptane, which match the fuel being tested. Because of the common use of benzol value based on straight run Pennsylvania motor fuel as standard, the results are also reported in terms of conventional "benzol value" as in the past.

Relation of Values

Fig. 4 gives the relationship between these different values as determined on the N.A.C.A. Universal Test Engine under the conditions outlined below. Although strictly applicable only to this engine and under these conditions, the relative compression ratio as indicated along the vertical ordinate at the left of the figure is approximately the same as would be indicated by road tests on representative water-cooled motor cars.

Six years of experience with as many different single cylinder testing engines, including L-head, valve-in-head, water-cooled, air-cooled, and evaporative cooling systems have led to the following equipment and method as entirely satisfactory and reliable, although not by any means ideal.

The single-cylinder variable compression N.A.C.A. Universal Test Engine used in these tests was developed several years ago in the laboratory of the National Advisory Committee for Aeronautics. It has a 5-in. bore and 7-in. stroke and is equipped with an aluminum piston. These dimensions, although larger than necessary, offer an advantage in that the engine is less sensitive to slight changes in operating conditions. The variable compression feature is made possible by raising or lowering the entire cylinder wall and

Knock-Rating Certificates

HAVING received many requests from oil companies for testing fuels and giving certificates of specific knock rating, the Department of Engineering Research, University of Michigan, has developed methods and installed apparatus for making such tests and is now prepared to issue certificates of knock rating. The work is under the supervision of Dr. George Granger Brown. In this article the equipment and methods used in making these certified tests are described.

head which carries the two camshafts, as indicated in Fig. 1. In this manner the compression ratio may be varied from less than 3.5 to more than 14.0 to 1. At 900 r.p.m., at which the knock rating tests are made, this range in compression ratio is equivalent to a variation in compression pressures of from 65 to over 425 lb. p. sq. in. In addition, the engine is also provided with means for varying independently the valve timing and lift through split cams on the two camshafts. Since any or all of these changes may be made while the engine is operating under full load, it is adaptable not only to fuel testing, but also to a study of the change in engine cycles upon efficiency and knocking.

The compression ratios as indicated by a revolution counter on the worm which raises or lowers the head were calibrated by direct displacement of liquid. The compression pressures were carefully determined at 900 r.p.m. with this valve timing (exhaust opens 33 deg. before bottom dead center; exhaust closes 8 deg. after top dead center. Intake opens 8 deg. after top dead center; intake closes 25 deg. after bottom dead center) by an Okill gage and found to be accurately represented by the following expression:

Compression pressure in pounds per square inch
gage = $34.25 \times \text{compression ratio} - 56$.

For controlling the speed and measuring the power output, the engine is coupled to a 50 hp. electric cradle dynamometer of conventional design. Al-

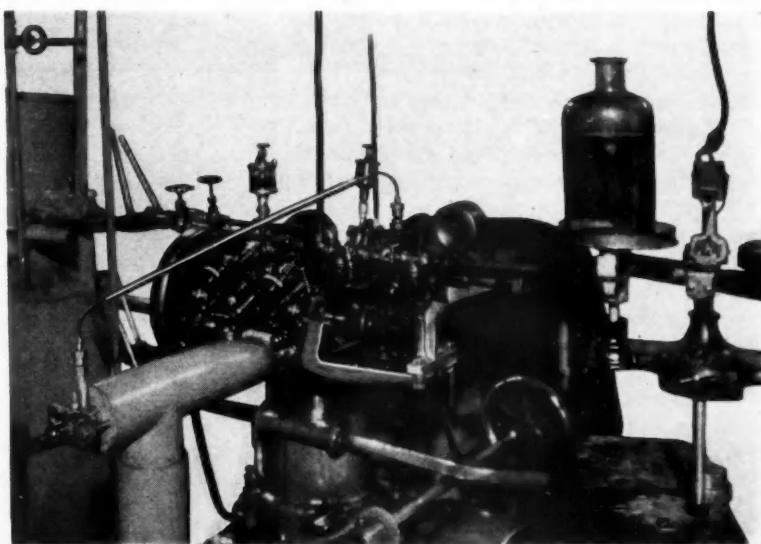


Fig. 2—Universal test engine, showing fuel pump mounting

though all tests are made with the air-fuel ratio giving maximum knock, the air-fuel ratio is always determined by direct measurement as a check on the setting made for maximum knock.

The air is first drawn past a hygrometer for determining its humidity, then through a Venturi and into a large surge tank to absorb the pulsations of the engine so as to give a steady reading on the Venturi. From the surge chamber the air passes through an electric heater capable of heating the air to 300 deg. F. and then into the mixing chamber leading to the engine.

The fuel handling system (Figs. 2 and 3) has seen many changes during the past three years. The fuel under test is fed from a weighing bottle on scales which automatically start and stop both a total revolution counter and a stop watch while supplying to the engine a predetermined weight of fuel. Originally the fuel was sent from the weighing bottle to a single jet carburetor. Although such an arrangement had proved satisfactory on other engines, the inclosed system for measuring the air caused extremely bad surging in the intake manifold, causing poor jet action and resulting in the engine running unevenly, or "hunting."

Furthermore, the throttle and needle valve adjustments on the carburetor were found to introduce variables impossible to eliminate. The carburetor was then replaced with a small positive-displacement fuel pump driven from the camshaft through a Reeves variable speed transmission. The pump served merely to meter the fuel and drop it into the intake manifold or mixing chamber where it was picked up by the air stream. Although rather crude, this arrangement produced more satisfactory results than the carburetor.

The next step was to replace this fuel pump with a Bosch fuel pump such as used on solid injection engines, driven directly from the camshaft. The fuel is fed to the pump from the weighing bottle and then sprayed through a regulation Bosch injection nozzle into the mixing chamber, which has a volume slightly less than that of the piston displacement. Although designed to handle fuel oil, the only changes necessary in the pump and nozzle were to replace the springs to provide for a much lower injection pressure.

Fuel Feed Equipment Used

This fuel feeding equipment has been found most satisfactory. It handles satisfactorily fuels ranging from distillates to the extremely volatile natural gas gasolines. The air-fuel ratio is easily fixed at any desired value by the standard pump control, which varies the amount of fuel injected at each stroke. Furthermore, when the air-fuel ratio is once set, it remains

constant for all speeds, provided the volumetric efficiency of the engine is constant. Variables due to different fuel jets and throttles have been entirely eliminated.

All tests are run at full load, but it should be perfectly feasible to throttle the air before it enters the mixing chamber or vaporizer and cut down the fuel delivered by the pump proportionately if tests at part load were desired. The only inconvenience in using the fuel system as described is in starting the engine, when the load must be quickly applied before the engine "runs away." Fig. 3 presents this system diagrammatically.

The fuel pump (Fig. 3) is mounted on a bracket and driven directly from the camshaft. Fuel is supplied to it from two sources, an outside tank and a bottle on the fuel weighing scales. The outside tank is used when warming up the engine, while changing the fuels in the fuel bottle, or when using large quantities of one fuel. The fuel bottle is used when determining the fuel consumption of the engine, or when only small quantities of a fuel are available, as in knock rating. Both fuel lines are provided with shut-off cocks and drain cocks close to the pump, so that one line may be

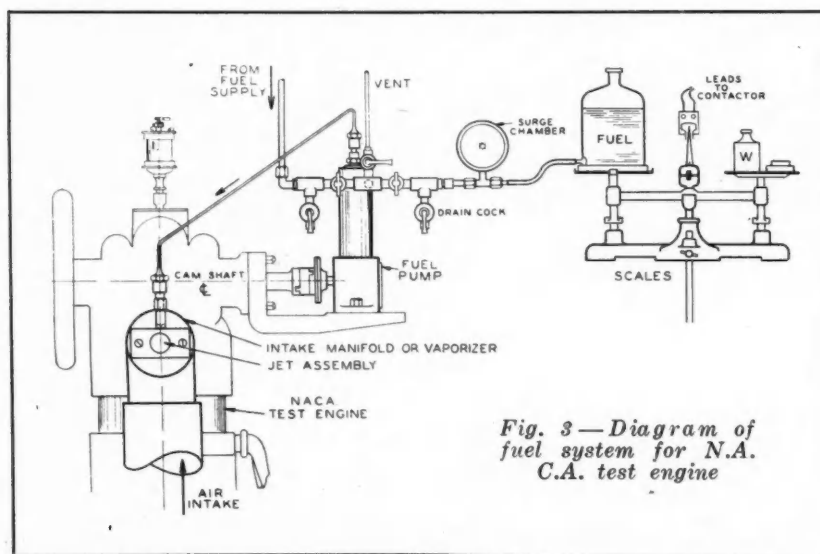


Fig. 3 — Diagram of fuel system for N.A. C.A. test engine

drained while the engine is running from the other.

The pump is designed with a constant stroke, and the fuel metered by varying the point of cut off, the remaining fuel being injected back into the supply line, rather than through the nozzle. As this produced objectionable surging in the fuel line to the bottle, the surge chamber was added to absorb these pulses. There was still a tendency for vapor lock when using extremely volatile fuels, which was eliminated by installing the vent directly at the pump, as shown.

Intake Manifold Simple

The intake "manifold," or vaporizer, is simply a cylindrical chamber 3½ in. in diameter and 13 in. long, into which the fuel is sprayed. The Bosch spray nozzle operates by the fuel pressure, forcing a small spring loaded valve off its seat and letting the fuel spray into the manifold. The spray angle is 15 deg.

The engine is built with separate cooling jackets for the cylinder wall and the head. Cooling is accomplished by circulating distilled water at a constant rate through a closed system. The water entering the block jacket is at 120 deg. F. and leaves the head at the exhaust valve at 175 deg. F. Oil is circulated from a tank outside the crankcase under pressure to the bearings, and leaves the engine at 140 deg. F.

Much has been said in favor of evaporative cooling because of the uniformity of temperature automatically maintained in the cooling jacket by this means,

but equally satisfactory results can be obtained by the proper circulation and control of cooling water. Adequate circulation appears to be equally desirable for either method of cooling.

In making knock-rating tests, the air is heated to 170 deg. F., the spark is constant at 30 deg. advance, and the air-fuel ratio is adjusted to produce maximum knock for each fuel tested. This ratio is usually between 12.5 and 13.3, but may approach 11 to 1 for high benzol blends. *In all tests the compression ratio is taken as a measure of the knocking qualities of the fuel.*

With the motor thoroughly warm and running at 900 r.p.m. full load, the compression ratio is increased until knocking becomes distinct. The air-fuel ratio is then adjusted to give maximum knock. The compression ratio is then lowered until the knocking disappears. The compression ratio is then again increased slowly until the point designated as first audible or incipient detonation is reached. This point is perhaps best described as that at which the knock changes from a dull rumble to include occasional sharp knocks of higher frequency. At this point the beam on the dynamometer is balanced, the compression ratio noted, a fuel and air consumption test made, and all temperatures are recorded. Obviously, the determination of this point of first audible detonation is a matter of the operator's judgment and can be done satisfactorily only after considerable experience. Even then the human variable may be present to a rather high degree, but the point of first audible knock closely approximates the point at which knocking is first observed in the motor car, and for this reason is considered of prime importance.

Maximum-Power Test

The compression ratio giving maximum power under the same engine conditions is then determined as an independent check. As the compression ratio is slowly increased it is found that there is a narrow range over which the power remains fairly constant at a maximum value, accompanied by severe knocking. A further increase in compression ratio reaches a point where occasional extremely severe knocks are observed, accompanied by a sharp drop in power. This point comes in sharply and is recorded as the compression ratio for maximum power. At this point, a fuel and air consumption test is made and all temperatures are recorded. This maximum-power point is almost entirely free from the human variable, and since it comes in sharply on most fuels, is usually the more reliable test of the two.

Stethoscopes, listening posts, thermocouples in the head, bouncing pins

and indicators have all been tried as indicators of first audible detonation, but without success. The listening posts and other aids to the ear so magnify the noises of valves in the head of the engine as to negate their usefulness. The bouncing pin when used at different compression ratios has been found to be affected by the rate of rise of pressure rather than by the knock, and cannot be used as an indicator of knocking under different compression ratios, but only as a null-point instrument with all conditions exactly the same.

In our opinion, the next important step in the development of knock testing will be some satisfactory method of indicating the point of first audible detonation which will be practically independent of individual variations in the aural organ of the tester. A standard mechanical ear for determining audible detonation is highly desirable.

Ratings are Checked

Usually the same benzol or iso-octane value is obtained by both the audible and the maximum power methods of determining the knock rating, but occasionally fuels are tested which show noticeably different knock ratings by these two methods of testing. However, it is always assumed that if the same knock rating is not obtained by the two methods of test, there has been some experimental error and the tests are repeated. If the same ratings are again obtained, the results are considered as checked.

The combustion chamber is at a higher temperature when taking the maximum power readings, due to the more intense knocking occurring under these conditions. This condition is believed to be a major factor in giving these different results. This conclusion has been qualitatively verified by testing these fuels at higher engine temperatures. It is surprising, not that different results are obtained, but rather that the results obtained by the two methods check so closely in most cases.

In making routine tests the primary standards, such as blends of benzene and heptane, or blends of iso-octane and heptane, are not used for purposes of comparison. blends of the standard Pennsylvania motor fuel and benzene which have been carefully calibrated in terms of the pure compounds are used as secondary standards.

The lines shown in Fig. 4 representing the relative compression ratios at which the different blends knock are drawn through data points obtained in three different series of tests more than one month apart. In all cases the points fall within 1.5 per cent of the line which is drawn as the best curve through the data (Continued on page 122)

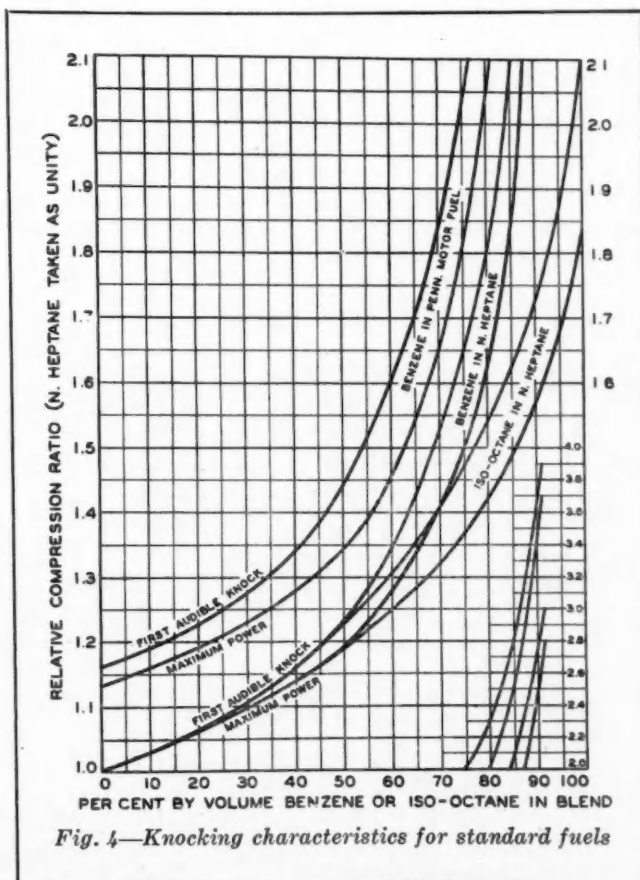


Fig. 4—Knocking characteristics for standard fuels

Accuracy, Speed and Operating Cost Help Determine Service Value

Replacement of old by new machines should be justified when an actual saving in dollars and cents can be shown. Special considerations must be included in survey.

By JOSEPH GESCHELIN

IS 10 years the limit of the economic life of a machine or are there circumstances which justify a longer or shorter period of useful service? Perennially, the factory management faces the problem of its existing equipment and it is increasingly difficult to decide whether or not certain machines should be retired or replaced. The ramifications of this question are pretty well known to the seasoned production man. But often he cannot marshal the controlling economic facts that might exactly fit his particular case.

Fortunately, this situation lends itself to careful analysis. So we decided to dig out some of the fundamental facts and expose them to the light. In the digging and the handling of the searchlight, we were enthusiastically assisted by certain well informed production men representing a cross section of automotive opinion. One of the things on which most of these men agree is the criterion of performance of a machine, new or old, summed up as follows, in the order of relative importance:

- a—Accuracy, within required limits
- b—Production rate
- c—Cost of upkeep

This performance factor when properly broken down does suggest a real basis for evaluating a machine, although other related elements enter in and are considered separately. Let us first apply our criterion or performance factor to the familiar case of existing equipment. Regardless of its age, a machine becomes a permanent fixture, and it is doing a definite job. We know a lot of things about this machine and can therefore gauge its performance factor with some assurance. Again we find unanimity of thought among production men concerning this analysis.

The performance characteristics of old machines, as a class, may be judged as follows:

1. Accuracy

This is given the place of prime importance, for in mass production, interchangeability breaks down if the prescribed tolerances are changed. Of course, in almost every plant this is watched by inspectors and a change in the accuracy of the finished part is usually caught in its early stage. If the cause is symptomatic it is readily ascribed to the machine, but it can be cured only by an overhaul.

When the desired limits of accuracy can no longer be maintained economically it is agreed that the useful life of the machine is ended for that particular part.

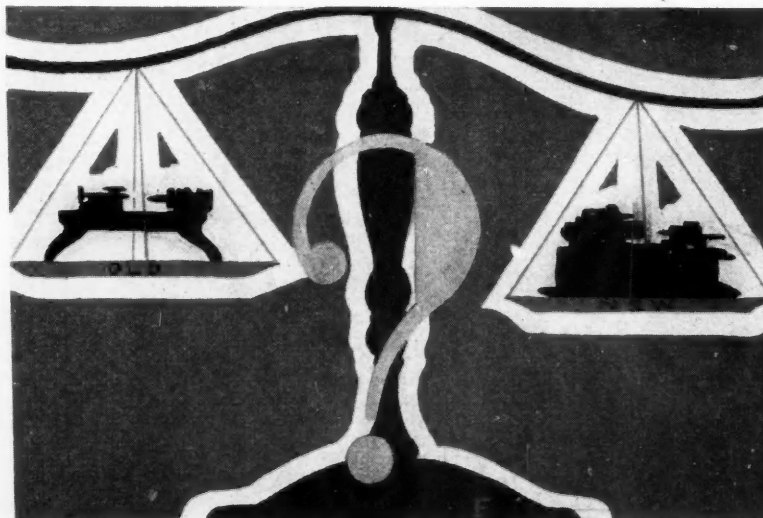
2. Production rate

If the machine is producing at its maximum it can hardly be made to increase its output without getting into mechanical difficulties. Granted that accuracy is satisfactory, the production demand controls the situation. Accordingly, if the demand for the part is stepped up beyond the capacity of the machine, the only solution is a new machine with greater capacity. On the other hand, special considerations may necessitate a new machine even if the old one is producing well within the limits of consumption.

3. Upkeep

This factor is interrelated with the maintenance of accuracy and includes inspection and repair of the controlling mechanical elements; general overhaul of the machine and its driving mechanism is also included in this account.

A number of production men say that the machine has passed its period of usefulness when the yearly cost of maintenance approaches 20% of the cost of a new machine where cost includes interest on the investment, de-



of Machine Tools

preciation, and maintenance (an estimated figure for a new machine). Another definitely limiting factor is the frequency and duration of tie-up for emergency service. Production schedules are paramount and frequent breakdown means that the machine has reached its limit of usefulness.

4. Cost and up-keep of tools.

Frequently the design of an old machine limits the use of new types of tools or cutting materials. This sometimes results in abnormal usage of tools or heavy charges for their upkeep and replacement, together with the added expense of frequent setups. When these costs are appreciable they swell the total for item (3) and accelerate the retirement of the machine.

Now we can weigh the new machine on the same balance, with the same units and see how it compares with our old one. For our purpose we shall differentiate between the standard and the special machine and consider the special machine separately.

1. Accuracy

This is now an estimated quantity but it is a function of the design of the machine and can be judged by certain key elements, such as bearings, gears, feed mechanism, indexing mechanism and sliding units.

Where quality of finish and fine tolerance are of unusual importance, a new machine offering these features is usually installed without much regard to cost and other economic factors.

2. Production rate

Most production men place this element second to accuracy only in order of precedence. However, on economic grounds the new machine is made to show an actual saving in cost amounting to about 20 per cent of the investment. On the other hand, even where the production rate is not paramount, the new machine may readily justify itself if it will replace two or more old machines.

3. Upkeep

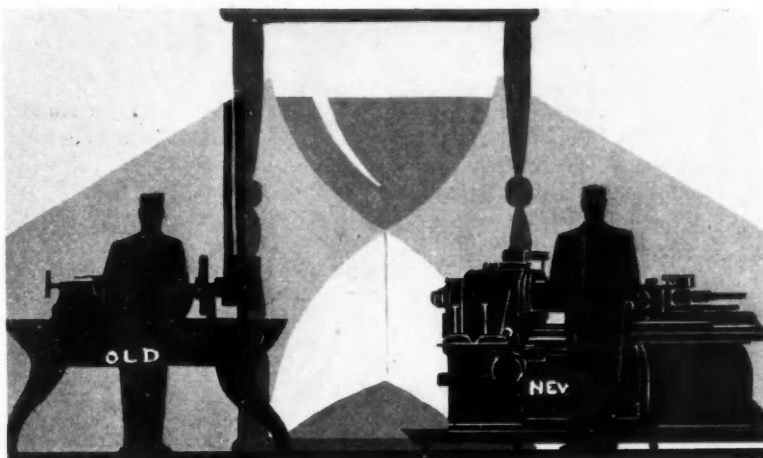
Naturally this is estimated in the light of previous experience. But due weight is given to a design which embodies ruggedness, ample bearing capacity, good lubrication, and other features of this specific nature.

4. Cost and upkeep of tools

A new machine may lend itself to new tooling and more advanced production methods. Moreover it may eliminate some type of tooling which has given especial trouble on existing equipment. Consequently, this will react favorably on the whole maintenance account.

Special machines are usually required for specific purposes. Where they provide a special process or a particular character of finish, the factor of cost is

generally subordinated. It appears to be current practice, however, to have the machine pay for itself within one or two years. This is the practice at the Timken-Detroit Axle Company, Deere & Company, and many other plants.



Now for some of the special considerations that always enter into the problem.

One manufacturer says, "In the automobile industry, changes of design (in parts) are so frequent that changes in machine equipment are frequently necessary, due to the fact that the new design cannot be produced on the old style machine." However, if a change in design

merely affects production rate, others agree with T. L. Loos, Indian Motorcycle Co., who says that, "in this case, a new machine is warranted if it makes a saving of 20 per cent on the investment."

Floor space is always important, but it becomes paramount when an unusual consumption demand taxes the capacity of the plant. Consequently, a new machine which can replace two or more old machines, or can fit in better with a realignment, becomes acceptable without the usual handicaps of cost.

Universality of a new machine also balances the scales in its favor, for it can be shifted around and adopted to other jobs when required. Then, too, this feature has a bearing on the life of the machine, and while on paper it may be calculated to depreciate on a ten-year basis, it nevertheless creates a strong impression on the mind of the production man.

Depreciation

A survey of depreciation accounting practice which appeared in *Automotive Industries*, June 15, 1929, indicated wide variations, although 10 years seems to be the generally accepted life period of a machine tool so far as paper records are concerned. We have checked still further in this present analysis and find a general leaning among automotive production men toward a 10-year life, although the machine is really expected to last longer.

H. L. Horning, president, Waukesha Motor Company, advances the thought that "10 years is a good basis although the nature of the work must be included in judging depreciation values. We think that output is a better index of depreciation as it includes the factors of both usage and time." Other experts consider it advisable to judge the life of a machine by the nature of its work, the severity of usage, and frequency of maintenance.

A recapitulation of some of the suggestions on this business of weighing the new machine against the old may be helpful here. Evidently the investment cost in a new machine is a handicap and an actual limiting factor chiefly in relatively small production plants. The primary consideration, other things being equal, is to balance the items of depreciation, interest on investment, and upkeep, of the old against the new.

(Continued on page 134)

Just Among Ourselves

Big Powerplants Coming to the Fore

IT looks as though the Cadillac V-16 were to be the fore-runner of a number of other twelve and sixteen-cylinder powerplants in American stock cars. This statement is made on the basis of the opinion of about a dozen different engineers and executives in as many different companies.

We started making inquiries because personally we couldn't quite see the field for the development of a large number of individual transportation vehicles powered by such large engine units. We had in the back of our mind the feeling among many of the industry's technicians several years ago that even the eight-cylinder unit was partly, at least, the result of "sales engineering." Since that time the eight has proved its place, but we rather expected to find something of the same psychology among leading engineers about the likelihood of further twelve and sixteen-cylinder development.

We did find that attitude to some extent, but a vast majority of the designers to whom we talked were definitely of the opinion that these larger powerplants were going to be fairly common within a year or so.

* * *

More Twelves and Sixteens in Prospect for Next Year

ONE of the most conservative of our engineering friends, connected with a factory successfully marketing a high-priced vehicle, surprised us by predicting that at least six 12 or 16-cylinder models would be on exhibition at the New York show in 1931.

The chief engineer of a big low-priced car company thinks that these larger powerplants will become more common, but does not think they ever will come down as far through the

price class range as has the eight.

After several days of casual checking up, we are prepared to agree with the prediction that there will be half a dozen of these cars in the show next year.

* * *

Early January Sales Are Better Than Expected

THE numerous price changes made during recent weeks have been various enough in character and tendency, it would appear, not to have had any adverse effect on buying. So far as could be determined from a rapid check, buying in general during the opening weeks of January was little behind that of 1929, while it certainly was a great deal better than most people in Detroit a few weeks ago thought it was going to be.

Despite the fact that price decreases just about equaled the number of increases during New York show week, there was relatively little "bargain sale" or "cut price" advertising copy. Reductions were announced to the public, of course, but nothing was done to give the public the idea that it had better hold off buying in hopes of further cuts.

As a result, the entire activity of New York show week unquestionably had a stimulating effect on the industry as a whole as well as on the many individual members of the automotive business who were there.

* * *

Merchandising Theories Are Definitely Divided

TWO rather definite and opposing merchandising theories seem to be at work in the industry today. At least some of the price changes made during the New York show might be so interpreted.

One theory is that the practice of allowing for used cars more than they are worth is so ingrained in the industry and the public that it must be accepted as a normal factor of retail operation, so the dealer discounts and the list price of the new car should be set to take that factor into account.

The other theory is that sooner or later used car trading must be got down to rock bottom, with cars being traded at such prices as will permit the dealer to resell at profit or at least without a loss. In such instances the tendency is to set the list price as low as possible, and to provide a dealer discount which might make over-trading result in business suicide.

* * *

Industry Faces a Test of Marketing Practice

BETWEEN these two extremes, of course, the average list price and discount policy lies. Each school has one or two strong adherents. A majority today still leans toward the "adequate" trade-in offer as a needed sales stimulator.

There are plenty of dealers as well as factory men who believe that the average buyer is more easily led to purchase when he thinks he is getting something for nothing, even though logic might prove otherwise. And this group has a wealth of practical examples to back up its reasoning and belief.

Both theories have existed for a long while, to be sure. The only difference now is that the industry faces a marketing situation which may provide better chance than ever before to prove or disprove one or the other of the ideas. It will be interesting to analyze 1930 performances on some such basis twelve months hence.—N.G.S.

Similarity in Body Lines Confuses the Public

During the coming months the designer has a great obligation to fill in pioneering new characteristics without jarring the buyer's sense of the acceptable.

By L. CLAYTON HILL *

Vice-President and General Manager,
Dietrich, Inc.

REPORTING briefly, yet not too seriously, on what progress has been made in body design during 1929, I have concluded, after a few hours visit to the New York Show, that the outstanding developments are the downdraft carburetor and the 8-in-line engine.

Apparently the boys with the flowing ties, smocks and berets have had the spotlight stolen from them by their less aesthetic brethren, the oil-spattered chassis engineers.

There never was a greater opportunity presented to the body designer possessed of courage and progressive ideas than that which exists today. One closely associated with the body engineering profession would be insincere were he to say that the 1930 show presented evidence of much sensational progress. If the exhibits at the Grand Central Palace are viewed impartially, one must conclude that automobile body appearance has reached a state bordering standardization, or perhaps we should say—stagnation.

General proportion, panel contours, roof sweeps, window shapes, belt molding treatments—these and other points which give to a body its distinguishing characteristics—have reached such a state of similarity, in most cases, as to confuse the buying public. There are several notable exceptions, of course, but it is not an infrequent experience at the show to hear one of the lay public who buy and drive motor cars, remark, "Oh, this is the Whoosis! I thought it was the Oofy Goofy."

This similarity of design has now spread even to the radiator and bonnets. Such a tendency seems particularly regrettable because the radiator is as much a distinguishing feature of a motor car as the face of a human being.

With bodies looking much alike and cars looking much alike, what are we to do to mark the next advance in body design? I certainly cannot answer that question. It is safe to say, however, that during the forthcoming year the body designer, particularly the custom body designer, has a great obligation to fulfill. He must begin to exercise his ingenuity instead of looking over competing models for his ideas. The management that employs him must become sufficiently courageous to accept the great responsibility of pioneering new design characteristics. This last factor will be of even greater importance than the first.

The experience of one of our largest car builders in introducing a distinctly different body style which failed of public acceptance has led all other manufacturers to be extremely

cautious. However, the introduction of some distinctive design points does not necessarily mean that these be so radical as to jar the public's sense of what is acceptable. Changes in design must of necessity be transitional, not abrupt. I do believe that all of us who appreciate the present economic position of the industry, and who recognize the importance of style in enhancing salability, will see that the far-sighted manufacturer and body designer will be busier seeking attractive individuality in 1930 than ever before. We are in a style industry.

It will be surprising indeed if the show in January, 1931, does not reveal two or three examples of advanced design in motor car bodies. Maybe we will pick up some of the evident trends abroad such as the deep-sided body with running boards abolished, the sloping windshield, sometimes of "V" design, or the streamlined rear end. Possibly the matter of wind resistance will come in for consideration, particularly in view of the persistent trend toward higher road speeds. There still exists the opportunity for a designer to produce a really attractive body without any moldings whatsoever. That is not as easy as it sounds, but it is not impossible, as some of the recent examples of foreign coachwork will show.

It would be distinctly unfair to say that 1929 did not produce many forward steps in body engineering. Without doubt, the bodies which were shown at the Grand Central Palace are greatly refined in outline and grace. They are more roomy and comfortable than they have ever been. The scheme of widening rear wheel treads to provide wide rear seats has been adopted almost universally. Cushions are in many cases deeper, springs are better and upholstering more comfortable. Leg room has been increased by lengthening wheelbases and utilizing the extra length in the bodies. Adjustable



L. Clayton Hill
Vice-president, Dietrich,
Inc.

*Excerpts from paper read before Metropolitan Section, Society of Automotive Engineers, January 6, 1930.

driver's seats are now standard on even the least expensive cars. It is logical that the arrangement for adjustment will eventually be used in rear seats as well, some bodies already having such provision. Head room still remains on the short side of what we might call the tall man's ideal. To provide for the man of extreme height means sacrifice of low appearance, a risk few designers and manufacturers will take.

Non-shatterable glass is being adopted by more and more manufacturers as standard equipment. It will only be a short time before all cars will be so equipped, at least in the windshield.

Many advances in body construction have been made which are not evident to the person casually inspecting a completed body. It may be venturing too far to say that the squeakless body has been made, but it is being approached more nearly by present-day bodies than their predecessors. Much is being learned about body structure through systematic road testing on proving grounds, on wracking machines and in laboratories.

We hear next to nothing about paint troubles today. Nitrocellulose lacquer and the latest types of synthetic undercoats have stopped this bugaboo of the service man. Finish on bodies is distinctly better than it was last year. This refers not only to paint but to plated metal parts as well. Stainless and rustless steel will be introduced in greater volume in 1930.

So one sees that there has been much progress in body manufacture in 1929 even though the change in appear-

ance is toward standardization rather than individuality.

A word should be said regarding convertible bodies. Bodies of this type will gain increasing favor with the American motorist. Very active and intense study is being given the shortcomings of the convertible body of the past. In great measure these have already been overcome.

Progress in this field will be rapid during the coming year. It is significant that one maker of medium priced cars has introduced a convertible four-passenger body at the show. Others will follow with certainty. Just because we have not built wholly satisfactory convertible bodies in the past is no proof that it is not possible, or indeed is not being done today. Keep your eye on the convertible body of the future. The American public will demand it and we must be prepared for that demand.

MARC BIRKIGT, designer of Hispano-Suiza cars, has taken out a patent on means for controlling the clearance in direct-actuated overhead valves. When the engine heats up, the stem of the valve expands, which in this case reduces the clearance. To compensate for this Birkigt makes the head slightly dish-shaped. In service the valve head always heats most in the center and least at the seat, hence on heating the concavity of the head will increase and compensate for the expansion of the stem.

Packard Offers Speedster Series on Eight Classes

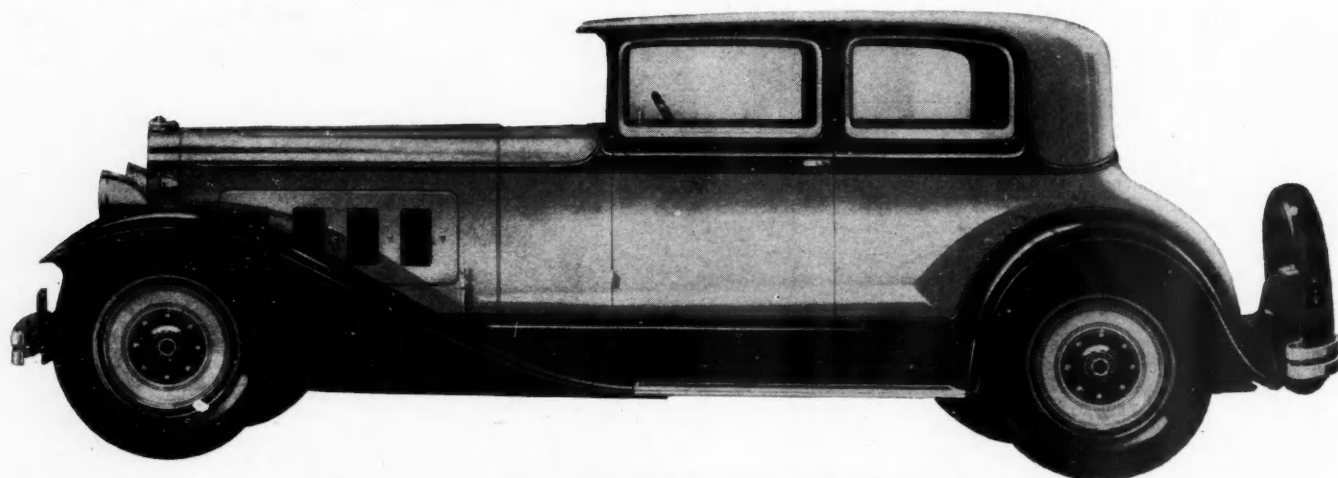
(Continued from page 111)

two ball check valves. The cylinder is diamond-bored, and pistons are lapped in, which accounts for the effectiveness of the piston action. The stroke is about $\frac{1}{2}$ in., with a bore of approximately 2 in. Specifications for this pump call for a minimum capacity of 18 in. of vacuum. Transmission of the drive from the camshaft eccentric to the piston is through a normal type of connecting rod design, with the exception that both ends of the rod are solid. The pump is connected directly in series with the manifold vacuum line, so that there is only a single connection to the vacuum tank, this being carried from the front of the engine along the right side rail of the frame to the dash.

Chassis driving units are identical with the Custom

eight, with the exception of final reduction in the rear axle, for which ratios ranging from $3\frac{1}{3}$ to $4\frac{2}{3}$ to 1 are available. Brake drums are drop forged and ribbed externally for better cooling. Wheels are 19 in., with 6.50 section tires. Rim locking rings are of the locking type commonly found on racing cars, unless equipped with drop center rims. On all models except the roadster, one spare wheel is mounted at the rear. On the roadster two spare wheels and tires are mounted in front fender wells. Wire or disk wheels are optional at no extra cost.

If the high compression head is specified, special anti-knock fuel will be required for satisfactory operation.



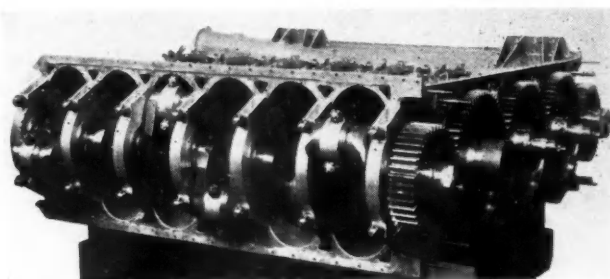
The Speedster Victoria, priced at \$6,000, announced by Packard

Junkers Develops Diesel Engine For Aircraft Use

*Powerplant, of the two-stroke double piston type, maintains
650 hp. up to an altitude of 11,400 ft. Weight is
2.6 lb. per hp. and piston speed 2160 ft. p.m.*

By EDWIN P. A. HEINZE

SOME information regarding the Junkers Diesel aircraft engine was given in a paper presented to the Society for Aeronautic Science in Germany at its recent meeting by Dr.-Ing. Gasterstadt of the Junkers Works. The engine is of the two-stroke, double-piston type originally developed by Junkers for stationary purposes. It weighs only 2.6 lb. per hp.



Junkers engine with crankcase and gearcase covers removed

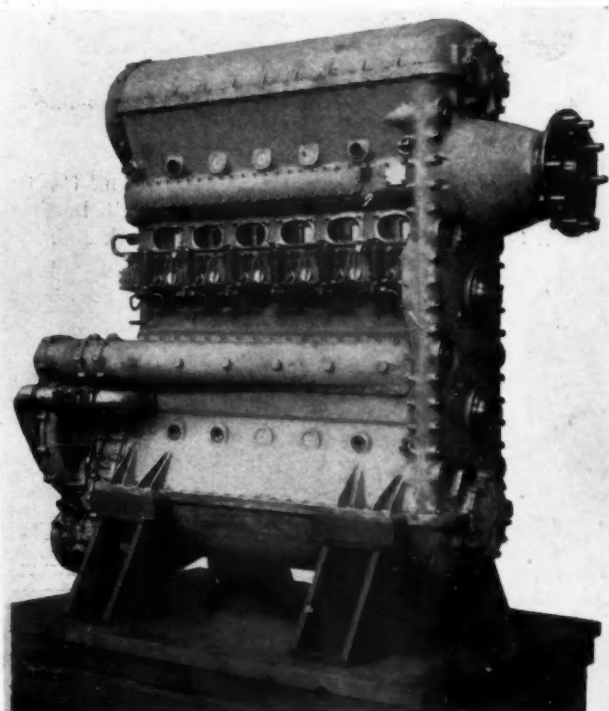
while the piston speed corresponding to maximum power output is 2160 ft. p.m. Two crankshafts are used, at the top and the bottom of the vertical cylinder block, respectively. The six cylinders, with a bore of 4.72 in., are cast in a single block of silumin, an alloy of aluminum and silicon, which has a specific gravity of 2.65. The block comprises not only the cylinders (which are provided with steel liners) but also the major portions of the two crankcases and the gearcase at the forward end. In order to make the engine compact and thus save weight, roller bearings are used on the crankshafts, one between each pair of adjacent throws. Five spur gears at the forward end connect the two crankshafts, the propeller shaft carrying the second gear from the top on a splined section. This shaft is carried in bearings in a turret projecting forward from the gearcase cover. At an engine speed of 1500 r.p.m. the propeller turns at 1100 r.p.m.

Of the two sets of duralumin pistons, the upper controls the exhaust ports and the lower the inlet ports. The upper crankshaft is set to lead the lower by a few degrees, which makes it possible for the inlet ports to remain open longer than the exhaust ports, even though the latter open first.

Air for scavenging is blown into the cylinders by the supercharger, at 17 lb. per sq. in. under full engine load, through scavenging ports provided with bridges and so shaped that the air enters tangentially and keeps up its swirling motion until the end of the compression

stroke. The supercharger is of the centrifugal type, with an impeller made from a solid block of duralumin and revolving at a peripheral speed of 656 ft. per sec. The impeller is driven from the rear end of the lower crankshaft through an internal friction coupling which prevents dangerous accelerations and decelerations.

Four open fuel nozzles are used for each cylinder, which are served by two pumps, one on each side of the cylinder. The pumps are located close to the nozzles, so that the lengths of the injection pipes are held down to a minimum, which reduces the inertia of the fuel column to be set in motion and the effects resulting from this inertia, as well as the so-called breathing action due to expansion and contraction of the fuel tubes. The nozzles are so shaped that the fuel leaves them in a fan-shaped spray which is inclined at 45 deg. to the piston heads. This quadruple spray, together with the vortex motion of the air induced by the form of the inlet passages, is said to result in a rapid intermixture of fuel and air and in a comparatively low fuel consumption. Fuel pumps are of simple design, with a mechanism for varying the stroke, the strokes



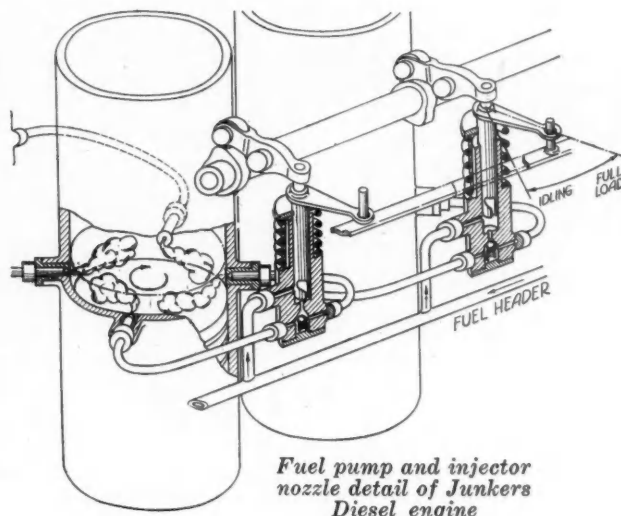
Junkers Diesel aircraft engine of 650 hp.

of all pumps on the same side being varied through a single control rod.

The output of the engine has been limited to 650 hp. by limiting the strokes of the fuel pumps, but this output, it is stated, can be maintained without manipulation of the controls up to an altitude of 11,400 ft. The fuel consumption is given as 0.365 lb. per hp.-hr. and the oil consumption as 0.033 to 0.044 lb. per hp.-hr.

Up to the time of writing the latest engine had seen 50 hours of flying service, including one non-stop flight of 8 hours' duration. It is fitted to a Junkers G-24 plane with an initial total weight of 10,330 lb., so that the loading is equal to 16.5 lb. per hp.

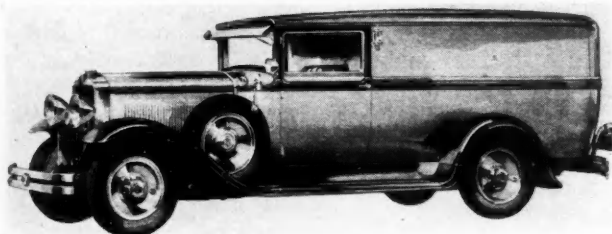
Starting is accomplished by compressed air admitted to the engine cylinders, no special starting facilities being required. It is claimed that there is no need for venting the fuel lines, as any air or gas that may have accumulated in them or in the fuel pump is discharged during the first revolution of the crankshafts with compressed air.



General Motors Light-Duty Truck

A NEW line of light-duty trucks in the $\frac{3}{4}$ -ton range, the Model T-15, has been announced by the General Motors Truck Co., Pontiac, Mich. It is offered in two lengths, the Model T-15 A having a wheelbase of 130 in. and taking a $7\frac{1}{2}$ -ft. body, while the T-15 B has a 141-in. wheelbase and takes a 9 ft. body.

These trucks are provided with a drivers' cab with three-point support on the chassis, two points of sup-



Sedan type of the custom delivery truck announced by General Motors Truck Co.

port being at the front corners of the cab and the third point centrally at the rear. Factory-built bodies of various types are being offered with the chassis.

The engine of the Model T-15 has six cylinders of 3 5/16 in. bore and 3 7/8 in. stroke and develops 58 hp. at 3000 r.p.m. Frame side rails are 6 in. deep, with 2 1/4 in. flanges and made of 3/16 in. stock. Including the engine support there are five cross members, the front and rear cross members acting as gussets.

Other specifications include a single plate dry clutch, a three-speed and reverse transmission, a roller-bearing worm type steering gear, adjustable as to angle, a spiral-bevel-gear-drive, semi-floating rear axle, with a standard gear ratio of 4.86 and an optional ratio of 5.86 to 1 and Bendix two-shoe internal four-wheel brakes. On the T-15 A the wheels are of the artillery type with steel felloes, wire and disk wheels being optional at slight additional cost. On this model a single tubular propeller shaft with two Spicer universal joints is used, the joints being oil-lubricated.

The fuel tank, on the left side of the frame, holds 17 gal.

The price of the chassis is \$695 f.o.b. Pontiac, Mich., while that of the complete truck with $7\frac{1}{2}$ ft. panel body on the T-15 A chassis is \$990. The so-called straight rating for this truck is 5400 lb., the body allowance being 900 lb.

Knock Ratings for Fuel

(Continued from page 115)

points, and in only three cases do the points fall more than 1 per cent off the line. The routine knock rating tests are accurate within the same limits. The compression ratio at which normal heptane shows first audible detonation under the conditions described is usually about 3.53, and that at which maximum power is developed is about 4.13. Relative to normal heptane, the new ethyl gasoline standard fuel as received from the Ethyl Gasoline Corp. laboratories at Yonkers, N. Y., shipped on Oct. 1, 1929, and identified as "motor gasoline anti-knock standard No. 11," shows a relative compression ratio for first audible knock of 1.42 and for maximum power of 1.33. This corresponds to an iso-octane value of 71 to 72 and a benzene value based on heptane of about 65 with a conventional benzol value based on Pennsylvania motor fuel of 48 to 49.

MANY have wondered why it was that the steam-cooling system, on which so much development work was done some five or six years ago, never came into practical use on automobiles. At an S.A.E. Metropolitan Section meeting some time ago Alex Taub said the trouble with it was that when the car is stopped and the heat stored up in the engine passes into the cooling medium, steam continues to be generated while the radiation of heat has practically stopped, and as a result, visible steam escapes into the atmosphere. Until a condenser is produced that will not let steam escape after the car is stopped there will be no steam cooling.

Federal Adds Six Truck Models To Complete 1930 Line

Of eleven separate types, three are carried over from last year, with some improvements, while two have no changes.

New series have wide range.

OF the eleven separate models included in the 1930 line of the Federal Motor Truck Co., six are new, three are carried over from 1929 with improvements and two are carried over without any changes.

The new models are E-6, 1 ton; A6T, 2½ ton; T10B, 2½-3 ton, bevel-gear drive; T10W, 2½-3 ton with worm gear; 4C6AB, 4-5 ton; and X8R, 7½ ton.

The 1-ton E-6 model is powered by a 3¾ x 4-in. six-cylinder engine developing 60 hp. at 2600 r.p.m. It is furnished in a standard wheelbase of 132 in. and in two optional lengths of 144 and 156 in. Power is transmitted through a 10-in. plate Borg & Beck clutch, four-speed Warner Gear transmission and Spicer propeller shaft and joints to a full-floating bevel drive Clark rear axle having a standard ratio of 5 2/5 to 1. The 6 x 2¾ x 7/32-in. steel channel frame is supported by semi-elliptic springs, 38 x 2¼ in. in front and 50 x 2½ in. in the rear. Attractive appearance is obtained by a newly designed radiator apron, hood, louvers and fenders.

Model A6T, 2½ ton, is of the same general design as Model A6, 2 ton, which is one of the three units carried over from 1929 with improvements. The former model, however, has a larger full-floating rear axle, larger rear brakes, heavier springs and is equipped with a vacuum booster.

Models T10B and T10W supersede Models T3 and T8. The new T models are larger and heavier, with changes as follows: Larger engine, heavier transmission with greater reduction, heavier springs with auxiliary, longer standard wheelbase, new design and heavier frame, larger rear brakes with booster equipment, heavier steering gear and new radiator hood and fenders.

Model 4C6AB, 4-5 ton, is of the same general design as the unchanged Model 4C6A, the only difference being that it is equipped with Westinghouse air brakes instead of four-wheel hydraulic.

Model X8R, 7½ ton, is similar to Model X8, of the same capacity, except that it is powered with a six-cylinder 4¾ x 4¾-in. Continental 21R instead of a four-cylinder 5 x 6 in. Continental B7 employed in Model X8. It also varies in that pneu-

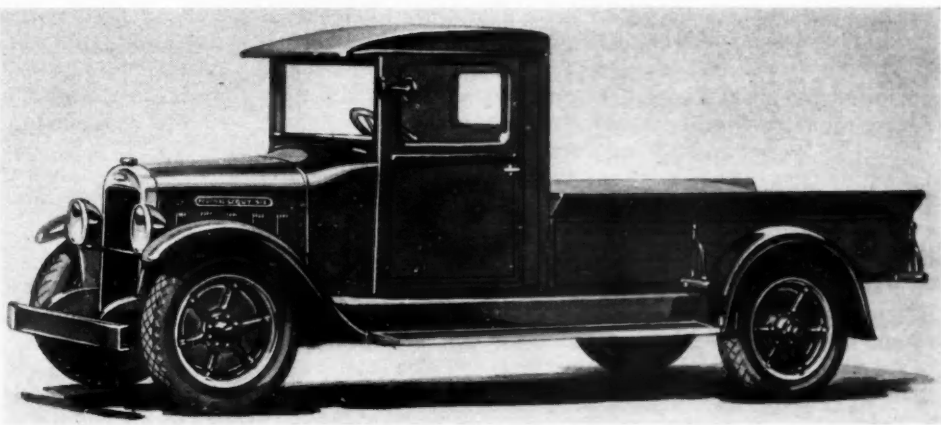
matic tires, 40 x 8 single front and dual rear, are standard equipment instead of solids.

Of the revised units, Model A6, 2 ton, has been changed to include a six-cylinder 3¾ x 4¾-in. Continental 16C engine, heavier full-floating bevel drive rear axle, lower first gear ratio in its four-speed amidships type transmission, heavier propeller shaft, springs and spring clips. The radiator hood, fenders and splash shields also have been altered in this model. A Purolator and auxiliary springs are standard equipment.

The only important change in Model F7, 1½ ton, is in the standard wheel and tire equipment. This model is now equipped with 30 x 5-in. 8-ply tires single front, dual rears, on ventilated disk type wheels. Changes in Models 8X, 7½ ton, include booster with larger brakes, pneumatic tires, 40 x 8 single front, 40 x 8 dual rear, on disk-type wheels and auxiliary springs.

Front Wheel Drive Claimant

WE are in receipt of a communication from Robert Schwenke of Charlottenburg, Germany, in which he states that in view of our recent description of several front-drive passenger cars, he wants to make claims to priority in this field. He states that he can furnish proof through the Mitteleuropaischer Motorwagen Verein (Mid-European Motorcar Association) that as long ago as 1905 he had a good-running car with front drive and four-wheel brakes. This car was built to the order of the Army Transport Department and was built by the Schwartzkopf Machine Co. He claims to have two United States patents on such drives.



Federal Model E6, of 1-ton capacity, with integral cab

Painted Plant Interiors Promote When Specific Requirements

Better lighting, resulting from a general scrutiny of departmental needs, is regarded as a definite asset in several major factories, because it improves workmanship.

PAIN'T is still the protective medium it has always been. But white and light tint paints serve another purpose too. They are definite assets to better lighting, better workmanship, and better production. When it is realized that the increase in foot-candles of light from a well-lighted building with a darkly painted interior to a well-lighted building with a white interior ranges from 15 to 25 per cent, the connection of light paints with workmanship and production will be readily appreciated.

What Cadillac has done in their new engineering building is an excellent example of the problems modern engineering overcomes in its effort to aid employees. Working conditions, acoustics, fatigue from improper flooring, lighting and painting are all

relief—the newly acquired glasses were discarded—the reflected light was soft and comfortable, whereas it had been hard and bright. Diffusion was good with either colored paint. White where light needs aid, but cream is softer where light may be too strong or where indirect lighting is used. In this instance cream proved better, because it is a softer and warmer reflector.

The experimental garage is practically daylight in an inclosure. Maximum space is devoted to window and skylighting, and all sections except colored pipe lines have the white walls and ceilings and green dado. Screen partitions are used so as to offer no resistance to light and air. Even the wire of these screen sections is painted white. The workmen on the floor are not in the dark surroundings usually attributed to garages, but in a cheerful, clean and well-lighted shop. The portion of the garage nearest the main building and farthest from the skylights and windows is a trifle darker than the shop maximum. But the white walls are the solution, and there are no dark, murky corners. The white paint offers every aid to diffused lighting.

Continuing through the Cadillac plant we meet another phase of constructive plant engineering, which always considers the human factor. The building style throughout the plant makes construction subservient to one item—illumination. There is a great central bay through the entire five-story depth of each building. Lighting is maximum because ample skylighting allows the light to penetrate, and white paint everywhere reflects it with the greatest efficiency. All floors are open galleries surrounding this bay—allowing maximum light penetration here also. The room

depth is not over average—10 to 12 ft.—but white ceilings and walls assure perfect dispersion of light to all sections of the building.

Many Problems at River Rouge

At the River Rouge plant of the Ford Co., every type of construction is encountered—and almost every painting problem. Ford keeps his plants well painted, well illuminated, well ventilated—operating on the principle that men need certain fundamental things for their own good and upkeep exactly as do the machines they operate. Paint is applied for cleanliness more than for any other. The remarkable cleanliness in various



Photo courtesy Cadillac Motor Car Co.

Drafting and planning room in the Cadillac engineering building. Walls, ceiling and columns are painted a soft cream color to diffuse the light from indirect artificial illumination

major problems. There are four floors equipped with every modern facility, including shops for the construction of complete automobiles and laboratory facilities for testing any part. It is at present a small factory within a factory.

The painting scheme follows that used throughout the plant—dado (lower section of wall) green, and ceilings and walls white. There is no hidebound adherence to this scheme. Sectional offices and drafting rooms are not white, but cream. An indirect lighting system is used in these departments. The ceilings and walls were originally white, and the draftsmen complained of eye strain—some began to wear glasses. After the color was changed, there was a noticeable

Automotive Production Efficiency Are Closely Surveyed

By T. J. MALONEY

The New Jersey Zinc Company

auxiliary plants—steel, cement, glass, paper—which are considered hard to keep up in other industries is one of the Ford plant's outstanding contributions to industrial efficiency.

Painting isn't done on any set scheme. A system of inspectors and the general scrutiny of division superintendents is responsible for the continual upkeep of the plant.

The foundry is a fair example. Most foundries are the bane of maintenance engineers' existence, yet this one is painted white, with a dark blue dado. And it is kept white—frequently washed down and repainted. In the mold and pour sections, where cast iron cylinder blocks are poured on a continuous system, the same scheme is used with a slight variation. White is the wall and ceiling color, the dado is black, and structural columns are painted green. The building itself is of a single-story cantilever skylighting type with maximum window space. Its cleanliness and illumination is comparable with the usual general machining section instead of the usual foundry. Molding pots and cupolas and electric furnaces are coated with aluminum paint—making a showy appearance. Imagine the differences in working conditions between this and the usual cast iron foundry.

The building that houses the blast furnaces is built



The experimental garage in the Cadillac engineering building. Layout, windows, skylights and white paint are combined to give an approximation of daylight

for a specific purpose. It is well lighted, and painted black—as are the furnaces themselves. The tuyere and bustle pipes encircling the furnace are coated with aluminum paint, as are auxiliary rails and platforms around the furnace. All auxiliary small ladles and parts are systematically coated with aluminum. Here is a department treated in a showy—almost modernistic—fashion with a black and silver effect.

Black for Absorbing Glare

Black in this case is the proper color—the light absorbing background which allows operators to be free from as much of the glare of the running metal as possible. It also gives the best background for their color tests, which are all by sight, telling just when to pour and what quality metal they are getting. Interestingly, the General Electric Co. has just such a black room where its manufactured lightning and high voltage sparks are examined. Paint and paint color work both ways—to aid light when light is needed—to absorb light when it is excessive.

A typical tool room has the dado in grey, all machinery is grey, the walls and ceiling white and the gallery also white. Switch boxes stand out—with a coat of aluminum paint. All grinding machinery is thoroughly inclosed and the dust drawn off and not allowed to scatter through the shop. A red line of trim between dado and white walls adds to the colorful effect. Red is also the fire color here as it is practically everywhere. All precaution apparatus, pipe lines, fire alarms, chemical extinguishers and the column spaces where they are hung are painted red.

The one-story saw tooth type of construction, rapidly becoming so popular, offers an interesting painting solution. The features of this type of building are its one story, ease of erection and maintenance, and excellent lighting. The Detroit Steel Products Co. has demonstrated that the outside slope

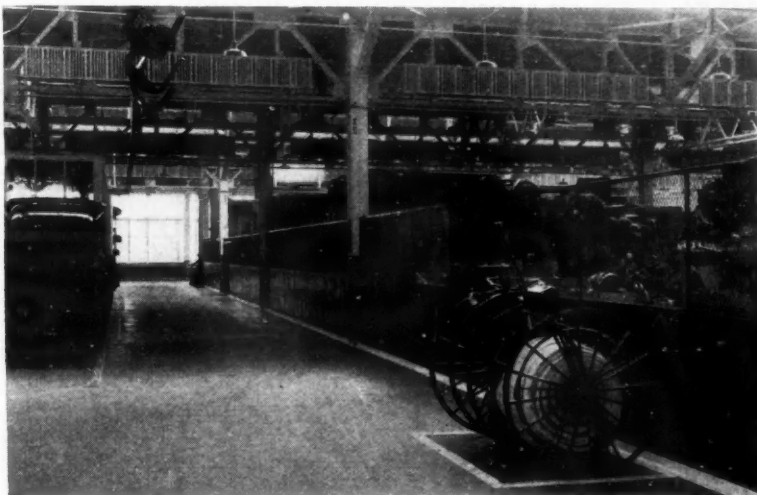


Photo courtesy Ford Motor Co.

Many painting features are included in the excellence of the Ford interiors. Red fire apparatus, white floor markings and base boards, dark line separations dado (lower section of the wall) and white walls give maximum reflection

*Coefficients of Reflection**

Color	Per Cent of Light Reflected
White, new	82-89
White, old	75-85
Cream	73-78
Ivory	62-80
Buff	61-75
Light green	49-66
Yellow	48-75
Gray	36-61
Light blue	34-61
Pink	30-46
Dark tan	17-63
Dark red	13-30
Dark green	11-25
Light wood varnish	42-49
Natural wood brown stain	17-29

* Compiled by A. S. Powell, Edison Lamp Works, General Electric Co.

of the roof, if painted white, can materially aid lighting. Sunlight which strikes here is reflected through the vertical window sections and increases lighting efficiency in the interior of the building.

The same applies to multiple story buildings which are gathered or built around a court. Usually the walls of the court are the same color as the rest of the building. If, however, they are painted white, or faced with a very light colored brick, the interiors of the buildings will receive the benefit of the sunlight when its rays hit these surfaces.

Suffice to say that in so far as plant painting is concerned the various plants at River Rouge are the equal of any plant in the respective industries—in most cases superior. The trained observer readily notices the difference in workmanship. Work is easier and thus work is better. Elimination of eye strain is important, and the establishment of clean, cheery working conditions is a human lubricant—an easer of the friction of old-time drudgery.

Obstacles in Machining Departments

But all is not gold that glitters. There's the case of another large plant in the automotive industry, a leader in efficiency and betterment of working conditions. One of the first steps taken to improve general conditions was to repaint the whole plant on a white color scheme and establish an excellent system of artificial illumination. (This was several years ago—one of the first industrial efforts.) On the whole it was a great success. But the transmission parts machining department offered insurmountable paint obstacles. The parts to be finished are heavy steel forgings, and the rough cut operation requires a heavy cutting oil. The heat of cutting causes a portion of the oil to vaporize, collect on the columns, walls and ceilings, condense and leave a heavy black deposit. Conditions are so bad at times that an actual fog of oil can be seen hanging near the ceiling. The walls and ceiling are painted white, and a black dado is used. The walls have become so heavily coated with oil in spots that it cannot be seen where the black dado ends and white walls begin. This, inside of six months.

How can this condition be corrected?

Only by elimination. Perhaps a different cutting oil—a better refrigerant which will not heat and vaporize. Certainly a better ventilation system even though it requires blowers, and hoods above the lathes to remove this fog of oil. Would the added expense of such a system be worth the cost, just to keep the paint white? No, but for the added sanitation, added comfort on hot sticky days, added advertising value of a clean, cheerful, well painted shop, and always better illumination, it would certainly pay.

Methods of Preventing Stain

Heat treating departments are difficult problems. But the Westinghouse Electric & Manufacturing Co. has a model heat treating department and they overcome the same difficulties encountered in the automotive plant mentioned by eliminating them. All quenching tanks are covered and furnaces are hooded to carry off smoke and oil. The department is painted white and there is no dirt in evidence anywhere.

This is typical of newer construction. Most of the difficulties—smoke, oil, acid, gas fumes, steam, etc.—are being defeated by the simple process of elimination. They aren't being eliminated because they ruin a paint job. But they create hazards and discomforts that workmen should not be forced to undergo, and dangers and expenses to production and maintenance which buildings shouldn't face.

The photograph of the grinding room of the Dura Co., large die casters and fabricators of automotive parts, graphically illustrates a modern plant interior of this type. Overhead shafting and belting are conspicuously absent, every buffer or grinding wheel has an individual hood, and a blower system with ducts leading into the floor instead of cluttering the ceiling with pipes. Piping of any sort except the necessary fire sprinklers is concealed. The saw tooth construction insures maximum natural illumination, and the electric lighting system is designed for flood lighting the entire shop. The walls and ceilings are white, to assure the ultimate assistance to either natural or artificial illumination.

The accompanying table gives the light reflecting efficiency of various colors. There is no standard terminology for paint colors. Two manufacturers may call a paint tint by the same name yet the difference in color may be seen readily with the naked



Photo courtesy Dura Co.

The grinding room of the Dura Co., where overhead shafting and belting are eliminated. The saw-tooth construction of the roof insures maximum natural illumination, and the walls and ceilings are white for ultimate assistance to either natural or artificial lighting

eye. So the broad ranges of efficiency shown are necessary. White shows the greatest reflecting value.

This article contains numerous examples of the uses of white and the light tint paints, based primarily on their light reflecting efficiency. Colors have other basis of comparison, and the psychological values must not be overlooked by the engineer. Red is exciting—blood, fire, danger immediately associate themselves with this color. Green is cooling—yellow warm and cheering, purple subduing, orange stimulating, blue is sobering. When machinery, tools, benches and desks are to be painted and light reflecting efficiency is not so important, consider color values from this second angle.

As an instance, the Beech-Nut Packing Co., like all food manufacturers, paints its plant at Canajoharie white throughout. But the cafeteria is painted green. Employees who must work in this constant atmosphere of white, enjoy a noon hour in a rest room of contrasting color—and the right cooling, restful color. The monotony of white is broken.

It is generally recognized that in addition to the benefits to operators from cheerier surroundings, better illumination and cleaner conditions, plant painting has a definite dollars and cents value in speeded production, fewer reductions and decreased electrical consumption. To compute these factors is admittedly hard—most manufacturers see the logic behind the whole situation and take much for granted. However, Westinghouse Electric, in the course of their experiments on lighting, have given consideration to painting in conjunction with artificial illumination and have measured foot-candle values and resultant savings in electrical consumption. Photographs of some of their results are included in the "Lighting" article in the new 14th Edition of the Encyclopedia Britannica.

Effective Color Tests

Various other interesting studies have been made. A fairly easy test of the color and cleanliness value of paint can be conducted in any plant—large or small. Paint all corners and baseboards in plant and on stairways white and notice the way it will stop expectoration in these spots. Very effectively (except for the character who will use it for a better target. Like the village half-wit, this eccentric will always be found.)

Women employees in one plant objected strenuously when steel trays, painted black and weighing about 60 lb., were substituted for wooden trays weighing 47 lb. New steel trays were then provided, identical in every respect except that they were painted an olive green. The complaints stopped at once.

In an office painted a light blue after being a light yellow for two years, the employees immediately complained of being cold. Temperature records of all the years would not substantiate this feeling, and it was necessary to increase the amount of heat several degrees before the employees could be satisfied. A change to the former color was followed by the entire disappearance of the chilling feeling.

Machinery, when considered as an integral part of the interior scheme, is painted either to harmonize with the general scheme, or to offer enough contrast to make a colorful plant. Both plans have their use. In the food industry, where cleanliness is the first consideration, the walls are white, the uniforms of the

workers are white, and the machines are white. There is complete color harmony, a spick-and-span appearance and the most striking aspect of cleanliness obtainable.

There is also a sameness, a monotony, that while not depressing is not always eye appealing. And the advertising factor is one not to be overlooked—especially in the automotive plant, where the customers are perhaps more often visitors than in most in-

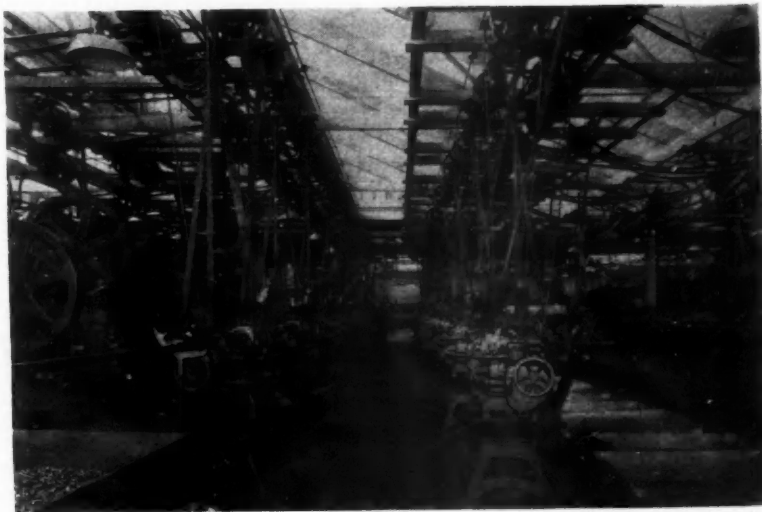


Photo courtesy Dura Co.

Proper painting and illumination will help overcome such light hindrances as rows of belting. Overhead skylights, proper placement of machinery and good painting make the shafting a negligible hindrance

dustries of comparative size or general interest.

A contrasting color scheme with the same white or light background offers many possibilities. Pipe lines in a large plant will be colored—usually in colors somewhat resembling those of the U. S. Navy Standard specifications—the fire-control apparatus will be red. And the machinery will be—what will it be?

It will be almost any color you care to make it. As it comes from the manufacturer today, it will be black, dark green, dark gray or dark blue. No doubt in a few years' time it will come in lighter—even gaudier colors. If you wish to repaint it when it is installed you will doubtless select a light color—else there would be no use of repainting on installation.

Light Colors for Hard Usage

If you paint it because it needs it after hard usage, you will still be interested in the possibilities of light colors. Among the commoner light colors used are light gray and light green, and white. Then there are the colors a trifle darker, but striking in appearance—certain shades of red, blue, olive, pea green, etc. With simply contrast in view the writer favors the use of the vivid colors which are not dark and gloomy, nor yet light, and as some light colors can be, drab. In this category are certain shades of blue which are finding vast favor. Blue has possibilities broader perhaps than any other color. At the Ford plant, where plant and machinery painting are an industrial art, a special blue has been developed which strikes the writer as the closest approach to color perfection for machinery. The same blue is used at the Timken Detroit Axle Co. It is midway in the scale verging a little toward the darker side, reminiscent of a Maxfield Parrish coloring. It is striking—almost star-

ting—when seen throughout a shop. And even though it has these qualities it has a density of color which does not show dirt at all readily. It is produced in a finish which has a glossy surface that washes easily—and can be dusted easily also. But in a dark shop, where light paint was not an aid but a necessity for lighting, it would not have a great enough light reflecting proficiency to be of value. And it loses its own startlingness in a poorly illuminated setting.

Shades of red—vivid cardinal and deep maroon are favored; an occasional orange is seen; green offers excellent opportunities, and an aluminum trim with its striking—almost glaring—effect adds character to the scheme. There is also the possibility of painting different machines different colors.

And then in different colors, the very logical use of white for machines which are placed in positions not

well supplied with sunlight. The writer is familiar with one example of a punch press room done completely in white; a very satisfactory solution from all angles for this particular installation. Spot painting—covering that portion of a punch, drill, shear or any other tool, directly behind the spot where the tool enters the material, thereby increasing the intensity of light at this point is a valuable use of light color on part of a machine.

It should always be borne in mind that the surrounding conditions have an important bearing on machinery painting, and solution should be based on the lighting and construction of the building, and the use of the machinery. As on walls, white paint is an excellent reflector of light and cleanliness. And as industry progresses, the lighter colors will become the standard paint colors for machinery also.

Electric Furnace Economies

IN an article in the Nov. 9 issue of *Automotive Industries*, Wirt S. Scott, of the Westinghouse Electric & Mfg. Co., discussed how the use of electric furnaces by the Salisbury Axle Co., Jamestown, N. Y., had resulted in lowering hardening costs. He pointed out that the first and prime objective in deciding upon the use of the electric furnace was to secure a better product without serious regard for the cost of power, since the cost of heating, at the most, whether it be fuel or electricity, is usually on the order of 1 per cent or less of the total factory cost of the part heat-treated. The judgment of the Salisbury Axle Co. has been more than justified in this respect, the product of the electric furnaces coming through so evenly heat-treated that it was found practical to reduce the test tolerance beyond all expectations, he wrote.

A surprising part was the showing of savings not at all anticipated, more than sufficient to pay for the entire power bill for heating, the investment charges and the labor for operating the furnaces thrown in for good measure, he averred.

The product from the fuel furnaces could not be held within close limits, or the rejections would be enormous, necessitating a slowing up in production to a prohibitive extent, with the result that the steel oftentimes would be so hard that tool breakage would cost from \$300 to \$400 a week, Mr. Scott estimated. For six months the breaking of tools averaged \$130 a week, whereas, before this period, the average was double that amount.

He stated that "the breakage of tools was not the only extra item of expense, since the hard, non-uniform steel required additional grinding of tools, longer time for doing a given amount of work and loss in time in setting up tools. This loss, amounting to \$130 a month, added to the tool loss, gives a total of \$650."

Maintenance

"The fuel furnaces were rebuilt about every three months at a total cost of \$1,200 a year," Mr. Scott continued. "In addition, every two weeks a furnace repair man and helper at 75 cents and 50 cents an hour respectively spent a full day on repairs, or \$22.50 per month, plus \$7.50 per brick work, etc., bringing the total monthly expenditures for these items to \$310.

"The electric furnaces have required no maintenance to date. The deterioration and ultimate replacement of the heating elements can be estimated at \$25 a month; other incidental repairs, oil, grease, etc., at \$10 a month, or a total of \$35 a month."

The summary of results in Mr. Scott's article is as follows:

Quality:	A higher grade quality is being served to the trade than anticipated.
Production:	The production is always a definite quantity.
Floor Space:	Electric furnaces in one-half the floor space is turning out more production than the fuel furnaces.
Rejections:	Rejects due to heat treatment have been reduced from 8 per cent to zero.
Monthly Savings:	
Labor for heat treating	\$69.70
Tools and labor after heat treatment	650.00
Maintenance	95.00
Heating cost	157.50
Total monthly saving	\$972.20
Total annual saving	\$11,666.40
Total cost of installation	12,500.00
Return on investment	93.3%

Road Troubles Caused by Misuse

THE English Royal Automobile Club has had in force for some four years past a scheme known as the "Get-you-Home" service for its large number of members. This service provides members with free relief car in the event of a breakdown or accident while they are on the road. Based upon the reports received from members and repairers under this scheme the club has issued an analysis of the cause of troubles in the many thousands of cases dealt with since 1925.

The commonest cause is ignition failure, and strangely enough the percentage of this cause was precisely the same for 1928 as for 1925.

It is pointed out that this high percentage does not necessarily imply that the ignition is the weakest point of modern cars, but that it may well be due to the lack of knowledge of ignition systems displayed by so many drivers. Rear axle shafts were second each year; but cylinders and pistons, third for 1928, have consistently increased in percentage since 1925; the latter may be due to the increasingly high engine speeds causing greater susceptibility to neglect of lubrication requirement or to the use of unsuitable oil.

There can be no question that in a very large number of cases the failures were due very largely to neglect or misuse.

S. A. E. Standards Report Adopted with Few Changes

First session of the Society's annual meeting in Detroit is preceded by a plea by B. M. Smarr for support of standardization work by individual manufacturers.

AT the meeting of the S.A.E. Standards Committee on Jan. 20 practically all of the reports made by 12 divisions were adopted as presented. The meeting was preceded by an informal talk by B. M. Smarr, director of Standards Section, General Motors Corp., in which he emphasized the duty of individual manufacturers to support the standards movement. The Standards session was the first formal gathering of the S.A.E. in its annual meeting held in Detroit this week.

Changes made in the proposals of the divisions at the meeting were as follows: In the report of the Aircraft Division covering an additional mounting for engine starters the starter jaws were shown to have a depth of 7/32 in.; this was changed to 9/32 in. In connection with the report of the Aircraft Division it was suggested that new values be given to dimensions *a*, *b* and *c* on tire valve No. 62 and that a change be made in airplane landing wheel rims, increasing the well depth 1/16 in., to prevent interference with fairing. In connection with the proposed change in the dimensions of the metric spark plug it was decided to change the depth of the thread below the gasket seat from 7/16 in. (as recommended by the division) to 27/64 in., subject to approval by the sub-committee which worked out the proposal; if not approved the recommended practice on metric spark plugs will be eliminated for this year.

In the specifications for laboratory tests of headlamps, the reference to the maximum permissible beam candlepower is to be omitted. Sketches elucidating the set-up for tests and beam candlepower requirements will be added to this standard. The proposed "general information" on die materials and rare metals was referred back to the chairman of the Non-Ferrous Metals Division. Several changes were made in the proposed nomenclature of body types. To the list of balloon tires for commercial vehicles on 20-in. rims a 5.00-in. size was added.

Roller Chain Standards

The Agricultural Power Equipment Division, of which O. B. Zimmerman is chairman, presented for approval a proposed American standard on roller chains, sprockets and cutters. This proposed standard has been worked up by a Sectional Committee of the American Standards Association, the work being sponsored by the A.S.M.E., the S.A.E. and the A.G.M.A. The proposed standard covers roller chain nomenclature, general chain dimensions, sprocket thickness and chamfer, negative tolerances on bottom diameters of cut sprockets, design of standard space-cutters for sprockets, standard sprocket tooth forms, working loads and horsepower, etc.

The Aircraft Engine Division, L. M. Woolson, chair-

man, recommended the adoption of an additional standard starter mounting for small engines which had received the approval of 24 out of 26 aircraft engine manufacturers.

A slight revision in the S.A.E. Recommended Practice for airplane wheel rims was proposed by the Aircraft Division, Edward P. Warner, chairman, to bring it in line with the specifications of the Tire and Rim Association of America.

Tables of ball and roller bearing dimensions were presented by the Ball and Roller Bearing Division, H. E. Brunner, chairman. Some of these, on annular ball bearings of the single-row type, involve a revision of the present S.A.E. Standard and are proposed for adoption as an American Standard, while the remainder, on annular ball and roller bearings of the wide type, are proposed as an American Recommended Practice, these bearings being intended chiefly for use in electric motors.

Metric-Size Spark Plugs

A slight modification in the specifications for the metric-size plugs was recommended by the Electrical Equipment Division, A. R. Lewellen, chairman. Last summer a specification was adopted which limited the reach from the gasket seat of the plug shell to the bottom of the skirt to 1/2 in. There had been some criticism of this dimension as unsuitable for passenger-car work, and the Division therefore decided to omit it from the specification and instead specify the length of thread measured from the gasket seat on the shell as 7/16 in.

The same Division proposed that the present Recommended Practices for spark-plug tests, starting-switch location, and rubber-bushing holes, as well as the present Standards for tests on insulating materials and starting motor cable, be canceled.

A joint committee on heat-treating definitions of the Society of Automotive Engineers, the American Society for Steel Treating, and the American Society for Testing Materials had gone over the present definitions of heat-treating terms, and the Iron and Steel Division, J. M. Watson, chairman, proposed several revisions and additions. The following three definitions are to be added under the general heading of Annealing:

Full Annealing—Heating iron-base alloys above the critical-temperature range, holding above that range for a proper period of time, followed by slow cooling through the range.

The annealing temperature is generally about 100 deg. Fahr. above the upper limit of the critical-temperature range, and the time of holding is usually not less than 1 hr. for each inch of section of the

heaviest objects being treated. The objects being treated are ordinarily allowed to cool slowly in the furnace. They may, however, be removed from the furnace and cooled in some medium that will prolong the time of cooling as compared to unrestricted cooling in the air.

Process Annealing—Heating iron-base alloys to a temperature below or close to the lower limit of the critical-temperature range, followed by cooling as desired.

This heat-treatment is commonly applied in the sheet and wire industries and the temperatures generally used are from 1020 to 1200 deg. Fahr.

Patenting—Heating iron-base alloys above the critical-temperature range, followed by cooling to below that range in air or in molten lead that is maintained at a temperature of about 700 deg. Fahr.

This treatment is applied in the wire industry as a finishing treatment or especially in the case of eutectoid steel as a treatment previous to further wire drawing. Its purpose is to produce a sorbitic structure.

Electric Head and Tail Lamps

The Lighting Division, C. A. Michel, chairman, had subjected its specifications of laboratory tests of the optical characteristics of electric head lamps and tail lamps for motor vehicles to a general revision and submitted the revised versions for approval. The Society already has a Recommended Practice on head-light construction, and a similar Recommended Practice on tail-light construction was proposed by the Division. This contains the following points:

1. All rear lamps, including license-plate holders and supporting brackets, shall, through suitable design and choice of materials, be of such strength and rigidity as to insure proper illumination of the license plate under all ordinary conditions of service.
2. The name of the rear lamp shall be prominently and permanently marked on the lamp body and also on the license-plate holder if the latter is detachable.
3. The rear lamp shall be substantially weather and dust-proof. It should also be constructed in such manner as to withstand the vibration normally encountered in service.
4. The license-plate window in the rear lamp through which light passes to the license plate shall be covered with substantially colorless glass or other material of suitable strength and permanency.
5. When tail-lamps are designed to center the license plate above or below the lamp and in which provision is made for bolting the license plate to the license-plate holder, the license-plate holder shall be provided with standard bolt-slots in the license-plate holder as shown in the S.A.E. specifications for license-plate bracket slots.
6. All license plates shall be provided with four standard round bolt holes,

two at the top and two at the bottom, for license-plate holes.

It was further proposed that the present S.A.E. Recommended Practice on tail and signal light mounting be made an S.A.E. Standard, in view of its very extensive use in the industry, and that the slots in the S.A.E. Standard license-plate brackets be made 1/16 in. longer than specified heretofore. Recommendations were made also for the size and locations of holes in license plates.

A series of electric incandescent lamp bulbs for motor boat use, of both the bayonet-base and the screw-base type, was proposed by the Motor Boat Division, Leonard Ochtman, Jr., chairman.

Non-Ferrous Metals

The Non-Ferrous Metals Division, Zay Jeffries, chairman, submitted some information on chromium plating, die materials, tungsten and other subjects, for inclusion in the S.A.E. Handbook. Following is part of the "general information" on chromium plating submitted:

"Practically all of the chromium plating done in this country at present is from solutions of substantially the following composition (with sometimes minor additions): Chromic acid (CrO_3), 200 to 300 gm.; sulphates, calculated as sulphuric acid, 1 per cent of the chromic acid and water to make 1000 cc. The current density and the temperature are the two important variables in the operation of the solution. Baths of this type usually produce a bright deposit over polished surfaces at a current density of 150 to 200 amp. per sq. ft. and a temperature of from 50 to 60 deg. Cent. (122 to 140 deg. Fahr.). Too high a current produces a burned or satin finish, while too low a current gives a bluish plate or fails to cover. Variations in temperature produce like results.

"Schneidewind has shown that the relation of current density, temperature, appearance of the plate and current efficiency can be plotted on a special semi-logarithmic paper as shown in Fig. 1.

Tanks for Chromium Plating

"The tank should be of steel, preferably low carbon, full annealed, although any material that the bath does not attack can be used, such as lead or glass-lined tanks. The steel tank can be used as an anode although it has the disadvantage that with steel anodes the steel will slowly dissolve in the solution, causing it to build up in iron oxide, thereby increasing the resistance and decreasing the throwing power. For this reason lead or lead-antimony alloy anodes are preferred by some platers. The distance between anodes and cathodes may vary from 1 to 12 in.

"The composition of the bath is kept uniform by the addition of chromic acid, water and, if the chromic acid does not contain sufficient sulphates as impurities, sulphuric acid or soluble sulphates. Care should be taken that the ratio of chromic acid to sulphates, calculated as sulphuric acid, is always kept at 100 to 1.

"Chromium is used for appearance, for prevention of corrosion, and for resistance to wear. The

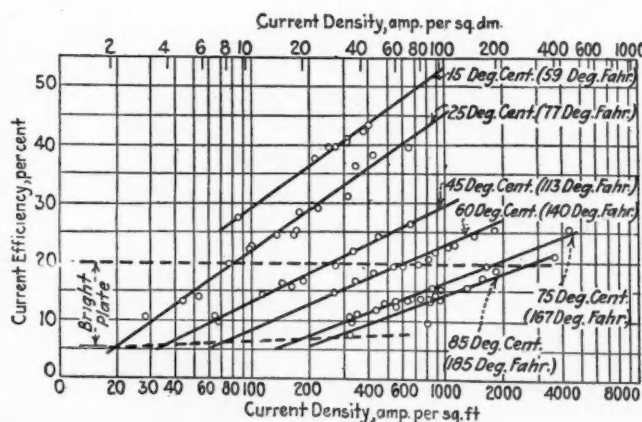


Fig. 1—Relation between current density and current efficiency in chromium-plating baths

chromium forms a tar-nish - resisting coating over other metals or plates, such as copper or nickel. In general, thin films of chromium are used for this purpose. The nickel and copper should each be at least 0.0004 in. thick, in which case a 3 to 5 min. plate of chromium is sufficient. The chromium can be applied directly to hardened steel or other surfaces to provide a very hard wear-resisting surface, since electro-deposited chromium is very hard. However, to secure best results when

used in this manner the chromium should be applied in relatively thick layers and the metal on which the chromium is deposited should be as hard as possible.

"The piece to be plated, whether steel, nickel-plated steel, copper or brass, is generally cleaned first in an alkali cleaner with or without the use of current. It is then rinsed in water, dipped in hydrochloric acid, rinsed and immediately placed in the chromium bath while still wet. If a polished chromium surface is required, the article should be polished and buffed before cleaning. Sometimes other methods of cleaning are used. When plating chromium over a nickel deposit some trouble may be experienced, due to the nickel peeling. This is best overcome by plating a heavy deposit of nickel from a hot solution. When plating chromium over nickel, it is necessary to keep the hydrochloric acid dip from becoming contaminated with copper, otherwise a thin film of copper will form over the surface of the nickel and the chromium will not adhere perfectly. Chromium solutions have poor "throwing power," that is, they will not plate into deep recesses. Therefore, if pieces of irregular shape are to be plated it may be necessary to use anodes of approximately the same shape as the piece to be plated."

Passenger Car Body Types

Revised definitions of body types were proposed by the Passenger-Car Division, G. L. McCain, chairman, which Division also proposed the cancellation of Recommended Practices on footman loops, passenger-car doors, wiring for beads, and wood screws, as well as a change in title of another Recommended Practice from Top Irons to Top Bow Supports.

A number of proposals were submitted by the Production Division, F. W. Stein, chairman. They included a proposed American Standard on milling cutters covering nomenclature and tables of dimensions of all kinds of cutters, including involute gear cutters. Other proposals submitted by this Division were a standard for Woodruff key slot cutters, a revision of the Recommended Practice on plug and ring gages, and of that on cut and ground threads for taps.

The Screw Threads Division, E. H. Ehrman, chairman, submitted a proposed revision of the American Standard and the S.A.E. Standard on wrench-head bolts and nuts and wrench openings, and a proposed American Standard and S.A.E. Standard for slotted-head screws.

A reduction in the number of standard passenger-car tires and rims from 19 to 15 was proposed by the

INFLATION AND SPACING TABLE

Rim Size, In.	Spacing, Center to Center Tire and Rim, In.	Tire Size, In.	
		Permits Oversizing	Does Not Permit Oversizing
5	7 1/4	5.00	5.00
5	7 3/4	5.00	6.00c
5	7 1/2	5.50	6.00
5	7 3/4	6.00	6.50
5	8 1/4	6.50	7.00
6	9	6.00	
6	9	7.00	7.50
7	10	7.00	
7	10	7.50	8.25
7	10 1/2	8.25	9.00
8	11 1/2	8.00	
8	11 1/2	9.00	9.75
8	12	9.75	10.50
9-10	12 3/4	9.00	10.00
9-10	12 3/4		10.50

Tire and Rim Division, H. M. Crane, chairman. The new table omits the 4.50-20, 4.50-21, 4.75-20 and 5.00-20 sizes, in view of the fact that these sizes have been or will be discontinued as original equipment, and adds a 5.28-18 size. Adoption of the new list brought the S.A.E. list in line with a list approved by the Tire and Rim Association on Dec. 13, 1929. A revision of the Society's standard for balloon tires and rims for commercial vehicles, in accordance with a new list adopted by the Tire and

Rim Association on Dec. 13, was also recommended. This list includes two rim diameters, 20 and 22 in., with 5.50, 6.00, 6.50, 7.00, 7.50, 8.25, 9.00, 9.75 and 10.50-in. tires for the 20-in. and 8.25, 9.00 and 9.75-in. tires for the 22-in. rims. A third table submitted for approval covers high-pressure tires and rims for commercial vehicles. This also was adopted by the Tire and Rim Association on Dec. 13. This includes two sizes of rims, 20 and 24-in., with tires for each varying by even inches from 5 to 10 in. Inflation pressure tables and a table for spacings for truck and motor coach dual tires, representing revisions of the present Recommended Practices, were also submitted by this Division. The table is reproduced above.

Ford Truck Improved

A NUMBER of important modifications and improvements have recently been incorporated on the Ford Model AA truck. Front axles have been strengthened, front springs are heavier with wider leaves, and front radius rods have been increased in diameter, the net result being a considerable increase in ruggedness of the front end. The center cross-member of the frame has also been strengthened and a new rear axle with spiral bevel final reduction has been adopted.

Taken together with the recent adoption of the four-speed transmission, the mechanical improvements made during the past few months are sufficient to enable the present Ford AA truck to be considered a new model.

Probably of greatest interest in the chassis changes is the new rear axle. It has a straddle mounted pinion shaft, the forward end being mounted on two opposed Timken taper roller bearings, and the overhanging shaft end mounted on a spigot roller bearing. The taper roller bearings at the front of course take the thrust. While the three-quarter floating type of design is retained, the axle shafts have been increased in diameter at some points. Differential side bearings are of the Timken taper roller type. Final reduction is 6.6 to 1.

In connection with the general strengthening of the front end, king pins, thrust bearings and wheel bearings have also been increased in size. Front brake drums have also been increased in diameter somewhat.

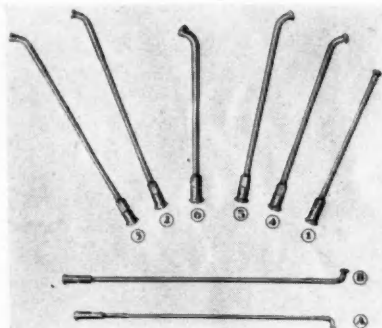
THREE firms prominent in the Austrian passenger car industry, Steyr, Austro-Daimler and Puch, have been merged into the United Austrian Automobile Works Austria. Controlling interests in the various companies were held by two Vienna banks, of which one recently failed and was absorbed by the other.

NEW DEVELOPMENTS—Automotive

Spokes for Wire Wheels

E VOLUTION in the forms of spokes for wire wheels is pictured in the accompanying illustration, which shows a series of spokes that have been developed by the Torrington Co., Torrington, Conn., a pioneer in the manufacture of such spokes.

No. 1 is a straight motor car wheel spoke of 0.175 in. diameter with a 0.156 in. blade in the center, straight-swaged. This spoke was largely used in automobile wheels until recently.



Spokes for car and motorcycle wire wheels

The next development, No. 2, is made from wire of 0.192 in. diameter, with 0.156 in. center blade. The same nipple is employed as with No. 1 and the spoke was developed with a view to increasing the strength. No. 3 is made from 0.203 in. wire and also has a center blade of 0.156 in., but it takes a nipple with a body diameter of 0.340 in., which is now practically a standard. This spoke is said to have seen wide use during the past four years, particularly on the heavier cars.

No. 4 is a spoke made of 0.205 in. wire and which takes the same nipple as No. 3; it is also swaged down to 0.156 in., but instead of being swaged straight, the blade has a double taper, its diameter decreasing from the head end of the spoke and increasing again toward the threaded end.

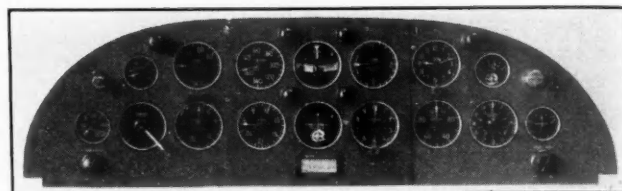
Spoke No. 5 is of 0.225 in. body diameter, the center blade being of 0.192 in. diameter. It takes the same nipple as the 0.205 in. spoke. Of these heavier spokes a smaller number are used per wheel.

Development through the different steps enumerated in the foregoing led to the present-day 1/4-in. full-tapered spoke, No. 6. It is made of 0.250 in. wire and swaged on a straight taper down to the threaded end, where the diameter is such as to take the 0.205 in. nipple. Advantages claimed for this spoke are that it improves the appearance of the wheel and that while stronger than the spokes previously listed, it still takes a standard nipple.

A and B show two types of motorcycle spokes, A being made of 0.148 in. wire and taking a nipple of 0.250 in. body diameter, while B is made of 0.175 in. wire, swaged down to 0.135 in. at the blade, and takes the same nipple. Of these two, A was originated some 20 years ago, but is still in use on lighter motorcycles, while B is used for wheels for the heavier machines.

Aircraft Instrument Board

A NEW instrument board for aircraft, developed by the Pioneer Instrument Co. of Brooklyn, a subsidiary of Bendix Aviation Corp., is shown by the photograph reproduced herewith. Mounted on the board are an oil-pressure gage, a thermometer for both oil and



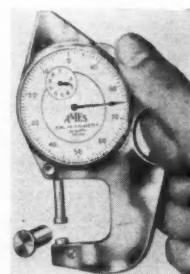
Pioneer Instrument Co. instrument board

water, a dual ignition switch with lock, a fuel level gage and flow meter, an air-speed indicator, a tachometer, a turn-and-bank indicator, an earth-inductor compass, an altimeter, a climb indicator, a clock, an air-distance recorder, a voltmeter, an ammeter and a rheostat.

The earth-inductor compass, which includes a generator and a controller, is the outstanding feature of the board. When the course for which it is set is being followed, the hand remains at the center of the dial. By turning the handle the course to be followed is set.

Dial Micrometer

F LAT, round or odd-shaped parts can be measured with facility by means of the new dial micrometer, recently announced by the B. C. Ames Co., Waltham, Mass. It has a 1-in. depth of throat and the dial is graduated in 1-1000 of an inch. By locking the spindle in any desired position, this micrometer can be converted into a snap gage.



Ames dial micrometer

Barbour-Stockwell Tachometers

T ACHOMETERS and combined tachometers and revolution counters made by the Barbour-Stockwell Co., 205 Broadway, Cambridge, Mass., have found extensive application on engine dynamometer stands, particularly in the aircraft industry. Combined counters and tachometers are made with a variety of scales, the lowest scale being 25-300 r.p.m. and the highest 300-3600 r.p.m. Simple tachometers without counter are made with the following scale ranges: 400-4800, 500-6000 and 600-7200.

The instruments are guaranteed to be accurate when leaving the factory and to remain so for 3000 hr. of continuous service. A complete line of fittings is available for hooking up the tachometer on the dash or in any other convenient position.

The tachometer itself is equipped with ball bearings,



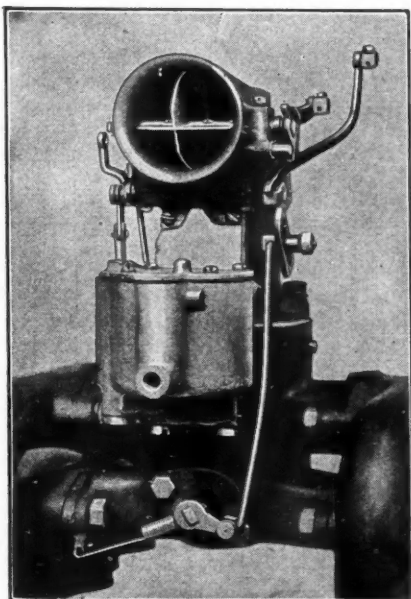
Reliance high-speed tachometer combined with revolution counter

Parts, Accessories and Production Tools

and the flexible shaft connecting the tachometer to the driving shaft has an exclusive ball bearing feature. The outfit has three distinct systems of ball bearings, which are claimed to prevent vibration and to insure longevity of the instrument.

Marvel Downdraft Carburetor

A NEW type of downdraft carburetor has been developed by the Marvel Carburetor Co. of Flint, Mich., a subsidiary of the Borg-Warner Corp. It is known as the Model D-O, and is of the air valve expanding type, and used in conjunction with a specially designed manifold employing the Marvel system of automatic heat control.



Model D-O Marvel downdraft carburetor

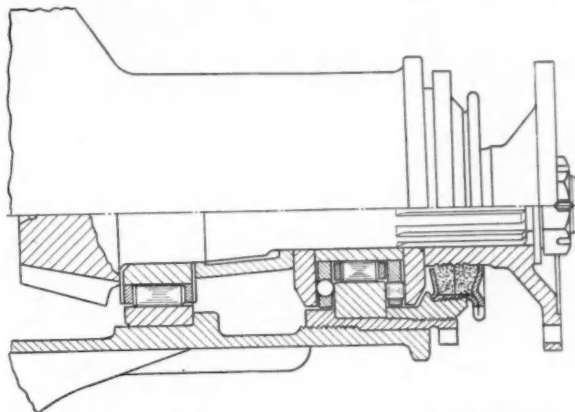
Air enters the carburetor at its highest point, above the cylinder block, where it is least contaminated with dirt and fumes and least exposed to excess heat. It is carried down through the mixing chamber, where it picks up atomized fuel and passes on to the heater chamber in the header assembly, where the fuel is vaporized, the mixture then being directed into the intake manifold.

The carburetor has three nozzles, all discharging into the mixing chamber and a spring-controlled air valve. The nozzles are of the non-adjustable type. The low-speed nozzle is located in a fixed air opening, while the two others, called the primary and secondary high-speed nozzles respectively, are located above the air valve and controlled by it.

An economizer metering pin jet surrounds a fuel-metering pin connected to the throttle. This pin controls the flow of fuel through the high-speed nozzles.

Pinion Mounting

THE accompanying drawing shows a novel mounting for the pinion shaft of bevel-gear driven rear axles which has been worked out by the Bantam Ball Bearing Co. of South Bend, Ind. It will be noted that the shaft, with which the pinion blank is forged integral, is mounted in two roller bearings taking radial load, and that thrust in the direction away from the axle is taken on a ball thrust bearing while thrust in the opposite

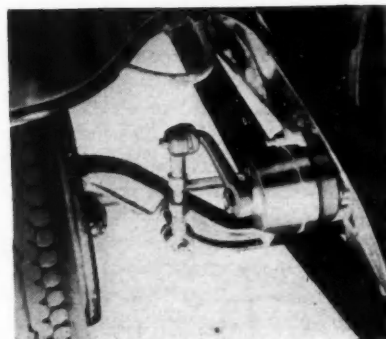


Bantam mounting for rear axle pinion shaft

direction is taken on a roller thrust bearing. The means of adjusting the pinion axially and the oil guard also are of interest.

Gabriel Spring Covers

IN connection with the description of new cars, repeated reference has been made in these columns to metal spring covers for the chassis springs. These spring covers are known as the Gabriel-Anderson-Ajax steel spring cover, and their distribution is controlled by the Gabriel Co., Cleveland, Ohio. When these spring covers are to be used, a recently developed penetrating graphite is applied to the contacting sides of the spring leaves. The graphite lubricant is retained by a heavy fabric sheath. Over this sheath is fitted the lead-coated steel cover, which provides an armor against dirt, grit, etc.



Gabriel-Anderson-Ajax steel spring cover

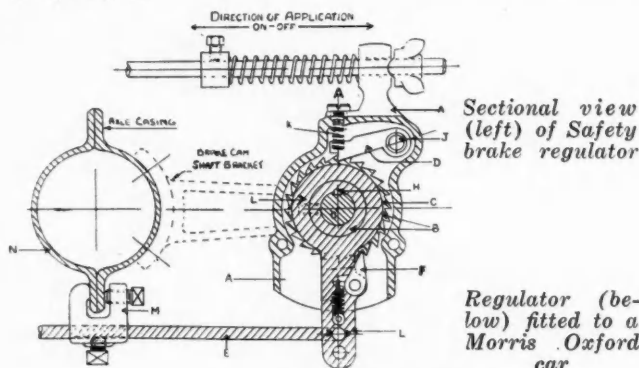
These metal spring covers are now standard factory equipment on the Cadillac V-16, the Nash Six and the Nash Eight, the Model C Peerless and Jordan Speedway model.

Self-Adjuster for Brakes

A NEW self-adjuster for brakes has been developed in England and is controlled by S. B. R. Patents, Ltd., of 293 Regent Street, London W-1. The design herewith illustrated is for the Morris Oxford, but the same principles can be applied to adjusters for other makes of cars.

From the illustrations it will be noted that the lever on the brake camshaft has been removed and replaced by a lever A which also forms a casing for the adjuster mechanism. The lever is pivotally mounted on a pilot

on boss *B* which is integral with and forms the center of the ratchet wheel *C*. The latter is keyed to the brake camshaft *G*, the original key *H* being used. A pawl *D* is pivoted on a pin *J* and pressed against the ratchet by spring *K*.



A bracket *L* is pivotally suspended from pilot *B*, its other end being secured in one position by an arm *E*, which in turn passes through a clamp *M* secured to the rear axle housing *N*. A spring-loaded pawl *F*, mounted pivotally on bracket *L*, governs the travel of the ratchet when moving in the "off" direction. As wear of the brake lining occurs, the lever will move the ratchet so that a tooth will be taken up by pawl *F*, and the arc the end of the pawl must describe when riding over the point of one tooth and down into the bottom of the space between teeth leaves a gap which allows the ratchet to travel the distance of the gap and no farther in the "off" direction. This is said to give exactly the necessary clearance between brake shoe and brake drum.

These movements occur only a few times during the life of the brake lining, hence there is no appreciable wear on the mechanism.

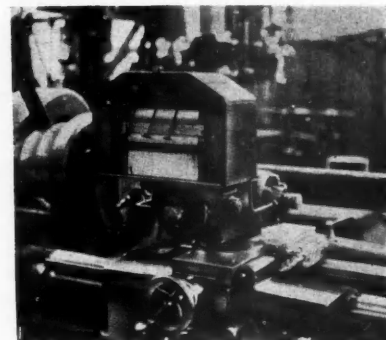
Measuring Cutting Tool Pressures

MEASUREMENT of axial, vertical and radial pressures on cutting tools is automatically and continuously recorded on the Losenhausenwerk Measuring Device which is distributed in the United States by Alfred Suter, 200 Fifth Ave., New York, N. Y. The device serves to determine the forces created at the tool edge. Two of these forces result from the cutting operation, i.e., a vertical force and a horizontal one acting perpendicular to the cutting plane. If the latter is resolved into one force parallel with the axis of rotation and another perpendicular to it (radial pressure in the direction of the tool shaft) then the three components perpendicular to each other represent the leading forces for the machine and the tool.

The tool is clamped tightly in the tool holder resting in a horizontal plane upon a pendulum support and supported sideways against the wall of the housing. The vertical pressure "V" is transferred at a suitable ratio to the vertical gage chamber situated in back of the recording instrument by means of a two-armed lever in the fulcrum of the pendulum support, while

the radial pressure "R" is transferred directly upon the gage chamber situated behind the tool holder.

To determine the axial pressure which may be acting in either of two opposite directions (depending on the direction of the feed) the tool holder is allowed to rotate about the vertical gage chamber in the plane of the supports. The pressures are transferred by means of an adjustable strut pin, to the gage chambers arranged on either side. Without complicated calculations, the qualitative and quantitative work of the tool can be gathered from the course of the forces, "L," "R" and "V." The ratio between these forces due to different feeds or different cutting speeds can be readily determined.



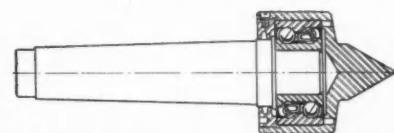
Losenhausenwerk measuring device for cutting tool pressure

Approximate Capacities, Weights and Dimensions

Vertical Pressure Lb.	Net Weight Lb.	Gross Weight Lb.	Dimensions of Sea Packing, in.
3,300	165	242	23 5/8" x 19 3/4" x 19 3/4"
4,400	198	297	23 5/8" x 23 5/8" x 19 3/4"
13,200	495	594	27 1/2" x 27 1/2" x 27 1/2"
22,000	770	880	31 1/2" x 31 1/2" x 31 1/2"

Ball Bearing Live Center

DESIGNED to facilitate machining with cemented tungsten carbide tools, a new ball bearing tail stock live center has been placed on the market by the Ready Tool Company, Bridgeport, Conn. It is claimed that the use of a live center with a minimum of overhang, reduces chatter and increases the life of tools. The bearing



Ball bearing tail stock live center made by the Ready Tool Co.

used in this center requires no attention to lubrication or adjustment of any kind. It is now manufactured in the most used taper sizes, but tapers of any type or size can be made if desired.

Value of Old and New Tools

(Continued from page 117)

And the new machine tips the balance when it proves actual savings in dollars and cents.

Despite the handicaps imposed, a new machine may nevertheless overbalance them by economies which are more important, at times, than other considerations. Among the more prominent of these elements are, universality, floor space factor, reduction of supervisory labor, and improvement in quality of output. Accordingly, a machine will win on these counts even in a plant where custom demands that it pay for itself in one year or two. The economics of machine tools deserve some deep thinking and more searching analysis, for what the production man needs today is a practical basis on which machines may be evaluated so that he may justify the expenditure for new equipment on a definite dollars and cents basis.

News of the Industry

PAGE 135

VOLUME 62

Philadelphia, Saturday, January 25, 1930

NUMBER 4

Annual Meeting Has Larger Attendance

S. A. E. Session More Numerous With Fewer Papers at Each

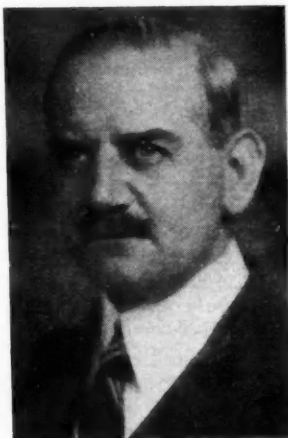
DETROIT, Jan. 22—With an attendance of 600 on the registration list, the Society of Automotive Engineers closed the third day of its annual meeting at the Book-Cadillac Hotel here tonight, and constant additions to the list indicate that the total attendance during the four-day meeting this year will exceed that of last year by a comfortable margin. The same number of papers as last year are being presented but the number of sessions is greater with fewer papers presented per session and a greater division of activity. At the general session tonight, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, spoke on the outlook for 1930.

"Students of the industry expect gradual increased buying during February with a rapid step-up of sales in the spring," Mr. Reeves said. "What will happen after July 1 will depend to a large degree on the general business conditions. Our industry along with others has learned much from its production spree of the first seven months of 1929 and conservative optimism will be the guiding factor this year. We must continue to maintain advertising, to strengthen selling organizations here and abroad, to encourage showing of our products whenever a buying atmosphere can be created, to work for broadening markets both here and abroad and in fact continue the vigorous merchandising methods that have put our industry in first place."

Other papers on the program of the four-days' session will be dealt with more fully in next week's issue of *Automotive Industries*.

A list of the 1930 officers of the society appeared in *Automotive Industries* for Jan. 11, page 59.

The society's roster now includes some 7000 of the leading automotive engineers and executives throughout the world. This summer, the society will celebrate its quarter century anniversary in connection with the Summer Meeting, announcement of which is found elsewhere in the News Section of this issue.



Alfred Reeves

General Manager of the National Automobile Chamber of Commerce, addressed the annual meeting of the S. A. E. in Detroit

Junking Plan Finds Wide Scope—Reeves

DETROIT, Jan. 22—Nine or 10 automobile manufacturers have already voted for junking plans similar to the one which has been operated for some time by the Chevrolet Motor Co., according to Alfred Reeves, general manager of the National Automobile Chamber of Commerce, who addressed the general session of the annual meeting of the Society of Automotive Engineers here tonight.

"Taking excessively old cars from the highways will result in a big step toward safety," he said, pointing out that when cars are junked, all wearing parts should be wrecked so that they could never be used in automobiles, this eliminating hazards.

The chamber is developing a standard dealer accounting system to aid in determining standards of cost of doing retail business, he said.

Canadian Car Production

WASHINGTON, Jan. 25—December production of automobiles in Canada, as reported to the Department of Commerce by the Dominion Bureau of Statistics, was as follows: Passenger cars, 4426; trucks, 1069, as compared with production in November of 7137 passenger cars and 2287 trucks, and production in December, 1928, of 6734 passenger cars and 2691 trucks.

Detroit Show Gives Impetus to Trade

Michigan Association Elects Officers in Connection With Exhibit

DETROIT, Jan. 22—The fifth day of the Detroit Automobile Show now being held at Convention Hall here, closed tonight with a total attendance record to date of 85,451, approximately the same number as attended last year's exhibit in the corresponding period. The dealer demand shown this year is fully equal to that of a year ago, according to show exhibitors and considerable optimism over the outlook for the 1930 selling season has been evidenced.

Today was designated "Michigan Day" in honor of the Michigan automotive trade, at the Statler Hotel. Several hundred dealers from various points throughout the state attended the several sessions which began with the annual election of officers this morning.

The new officers are: H. J. Allington (Hudson), Saginaw, president; A. B. Burkholder (Chevrolet), Grand Rapids, vice-president; J. W. Neumann (Pierce-Arrow), Detroit, treasurer; H. H. Shuart, who is manager of the Detroit Automobile Show, secretary. The directors are: W. H. Dunn (Cadillac), Jackson, second district; John Hinga (Ford), St. Joseph, fourth district; B. R. Dodds (Ford), Detroit, thirteenth district. Directors at large are: G. H. McVannell (Ford), Flint; E. L. Wright (Ford), Hillsdale, and D. R. Livingston (Reo), Adrian.

Today's program included addresses by Henry Kirkland, vice-president of Picard-Sohn of New York and Chicago; Paul R. Acton of Weaver Mfg. Co., Springfield, Ill.; James Dalton, industrial editor of *Motor*, and M. D. Graham, field secretary of the Michigan Automotive Trade Association. At the banquet tonight, Homer Guck, publisher of the *Chicago Herald-Examiner*, spoke on "Automobile Publicity." He was introduced by H. A. Montgomery, editor of the *Detroit Times*. Albert Parfet, president of the association, made the address of welcome and presented engraved gavels as attendance awards to representatives of several local dealers associations.

Mill Competition Drives Steel Bar Prices Down

NEW YORK, Jan. 23—As the result of stiff competition between Cleveland and Pittsburgh mills for Detroit business, the market for steel bars has given way to the extent of \$1 a ton, desirable business now carrying a price of 1.85 cents, Pittsburgh, as compared with 1.90 cents which had been the prevailing price since September and with 1.95 cents last April. Shapes and plates had previously dipped to 1.80 cents, Pittsburgh. With these declines the market, as a whole, has rounded out a downward movement to the extent of \$1 @ \$2 per ton in the first three weeks of the year.

There has been considerable discussion of late whether this tendency reflects in any way economies resulting from the numerous technical improvements in rolling mills. Publicity recently given to the invention of a casting machine for which it is claimed that it so simplifies the shaping of semi-finished steel descriptions that \$4 @ \$5 a ton will be lopped off their cost has caused consumers to wonder whether the lower price tendency is likely to endure because of this and kindred short cuts in the manufacture of steel.

There is no indication so far that the moderate recession in prices that has taken place differs in any way from that which usually ensues when slowly growing demand overhangs the market and each producer keenly competes for his share of it. In the past when demand has broadened sufficiently to give all mills a good operating rate, the market has always steadied and later stiffened in response to this change. There is little likelihood of any change from this orthodox condition. In many cases huge sums have been expended by mills to make production more flexible rather than merely more economical, so as to be able to care properly for hand-to-mouth demand. The relatively slight declines in steel prices in the last three weeks were just a case of the market slipping, and so far have no further significance.

Pig Iron—Some automotive foundries are negotiating for round lots for shipment over the first half of the year, but there is still considerable irregularity in the industry's melt. Recent reduction in the price of Buffalo furnaces to the extent of \$1 a ton has had little effect on the market generally. The Michigan market continues at \$19.50 @ \$20.

Aluminum—Moderate demand is noted. Aluminum foundries are not disposed to anticipate their requirements of metal any more than is absolutely necessary. Prices are entirely unchanged.

Copper—Curtailed production by the leading producer is being followed by others. Consumers are buying from hand to mouth. The price for electrolytic copper remains unchanged at 18 cents, delivered Connecticut, and 18½ cents, delivered Middle West.

Tin—The tin market recorded at the opening of the week a decline to 38½ cents for prompt Straits, the low for this and last year. According to Singapore reports, more and more tin properties are cutting down on production.

November Aviation Exports Reported

WASHINGTON, Jan. 22—Foreign countries purchased aircraft, engines and parts valued at \$687,123 from this country in November, 1929, according to statistics made available, Jan. 20, by the Department of Commerce. Exports included 31 aircraft, 17 engines, and parts valued at \$242,575.

China led with the number of aircraft imported, while The Netherlands purchased the largest number of engines, and Canada was the largest importer of aircraft parts. China purchased eight aircraft valued at \$169,770 and The Netherlands imported \$34,866 worth of engines. Canada bought parts, except tires, to the value of \$56,160.

Aircraft, engines and parts valued at \$101,844 were shipped to Hawaii during this period. Parts valued at \$853 were shipped to Porto Rico.

Canada imported seven aircraft valued at \$63,951, which was the second largest amount purchased. Canada also purchased the second largest amount of engines, which were valued at \$13,332. China was the purchaser of parts to the value of \$44,371, the second purchaser.

Dodge Increases Schedule

DETROIT, Jan. 22—Production increases for January totaling 116 per cent were announced yesterday by Dodge Brothers. Orders placed by dealers at the recent national convention in Detroit, it is said, far surpassed the expectations of sales officials, and practically absorbed the entire original production volume planned for the month. Additional business resulting from the New York national automobile show necessitated an immediate increase of 33 per cent in production of the new low-priced Dodge Six and an 83 per cent increase in the output of the eight-cylinder models in order that this line might maintain its relative proportion to the six-cylinder schedule.

Invents Windshield Device

ST. LOUIS, Jan. 20—A device which utilizes two blasts of hot air to heat the windshield of an automobile and keep it clear of sleet and frost has been invented by Bernard C. Freise, a St. Louisan. Heat is provided through a pipe running alongside the exhaust manifold to the upper footboard. Part of the hot air is fed to a standard heater set in the floorboards, and the rest is forced into two blast nozzles at the base of the windshields.

Durant Opens Factory Branch

DETROIT, Jan. 22—A new Durant factory branch in Detroit was opened Saturday, Jan. 18. The branch is located on Cass Ave. opposite Convention Hall and conveniently near the general offices of Durant Motors, which are on Woodward at Putnam. Edgar W. Mong is manager.

Hug Co. Introduces Two Models, One Six-Wheeler

HIGHLAND, ILL., Jan. 20—The Hug Co., has introduced two new models, a five-ton six-wheeler and a 2½-ton four-wheeler. The six-wheeler, designated as Model 97-6, and having a maximum load capacity of 18,000 lb., is designed for heavy duty service in the dirt, gravel and coal hauling fields. Model 67 with its maximum load capacity of 6500 lb. is specially designed for highway and street maintenance or all-purpose contracting, road builder service.

The powerplant includes a 4½ x 5½ in. six-cylinder Buda CA-6 engine, developing 78 hp. at 2500 r.p.m. A single plate clutch is used with a seven speed amidships type transmission providing for a low low and an overgear drive. Westinghouse air brakes on all four wheels and a 16-in. two-shoe Tru-Stop disk type parking brake, makes up the braking system. Model 67 is powered by a six-cylinder 3¾ x 4½ in. Buda H-298 engine, developing 86 hp. at 3000 r.p.m.

Bank Sponsors Car Ads

DETROIT, Jan. 20—The National Bank of Commerce of Detroit is sponsoring a series of institutional advertisements for the benefit of the automotive industry in the Detroit newspapers in connection with the Detroit automobile show. Copy for the advertisements was prepared by C. C. Winningham, Inc. It was originally designed for use of a similar campaign in the metropolitan newspapers by the National Automobile Chamber of Commerce. Use of the copy can be obtained for local automobile shows by communicating with the National Bank of Commerce, it has been announced.

Wood Hoist Buys Hydraulic

DETROIT, Jan. 23—The property and assets of the Hydraulic Hoist Mfg. Co., St. Paul, Minn., builder of the "St. Paul Hoist," have been purchased by the Wood Hydraulic Hoist & Body Co., Detroit. The Wood company has announced that business of the Hydraulic Hoist Co. will be continued under the same management and that "St. Paul" hoists will be marketed through same dealer organization which has handled them in the past.

Plans have been developed to build a body plant at St. Paul or Minneapolis to take charge of the requirements for bodies specified for shipment with hoists out of St. Paul. The body plant will concentrate on a standard line of steel dump bodies particularly for use with the "St. Paul" hoist. The name of the acquired company has been changed to the St. Paul Hydraulic Hoist Co.

Formica Has New Lines

CINCINNATI, Jan. 22—Production capacity of the Formica Insulation Co. has been increased 25 per cent, and the increased capacity is operative, according to an announcement by the company.

New German Bill Would Raise Duties, Fix Quotas

WASHINGTON, Jan. 23—A proposal to limit the present import duties on automobiles and parts to a fixed maximum annual contingent for each country with much higher duties to apply on all importations above that contingent has been embodied in a bill approved by the German Reichswirtschaftsrat (Federal Economic Council) and the Reichsrat (Federal Council), said a cablegram received by the Department of Commerce from Commercial Attache H. Lawrence Groves, Berlin. It is expected that the bill will be presented to the Reichstag in the near future.

Unofficial sources place the quota limit at about 2000 units per country. It is understood that an increase of the existing import duty of 75 Reichsmarks per 100 kilos, applying to the United States and all other countries on a favored-nation status with Germany, to 300 Reichsmarks per 100 kilos is being proposed for all importations above the annual contingent.

The German government is reported to be still neutral on the subject, but it is stated that the bill will have the support of several political parties in the Reichstag, with a fair prospect of favorable consideration, although possibly not to the full extent desired by the German automobile industry. However, any increase in the autonomous rate of duty and the limitation of the present conventional duties to given contingents can only be made effective after Germany has secured an agreement on this matter with those countries whose commercial treaties include bound automobile duties. The countries are France, Italy and Belgium.

Chrysler Adds Marine Line

NEW YORK, Jan. 20—A new straight eight marine engine called the "Majestic" was exhibited at the Silver Anniversary Motor Boat Show at the Grand Central Palace. An L-head type, with a bore of 3½ in. and a stroke of 5 in., the new engine is said to develop 152 b.h.p. at 3200 r.p.m. It is available with both clockwise and counter-clockwise rotation. A Chrysler designed quiet 2 to 1 reduction gear is also optional.

The complete Chrysler line of marine engines now numbers 11, divided into four series, Imperial, Crown and Royal, besides the new Majestic, designed for boats from 18 ft. to 65 ft. in length. Chrysler reverse gearing is a feature of all types.

Air Associates Sales Drop

NEW YORK, Jan. 21—Air Associates, Inc., report net sales of airplanes for 1929 of \$102,000, a decrease of 43 per cent from airplane sales for 1928. Sales of merchandise and accessories, however, from the first New York Division reached a total of a quarter of a million dollars, or an increase of 400 per cent over the preceding year.

Ford Seeks to Lift Embargo on Planes

DETROIT, Jan. 22—The Ford Motor Co. has instituted proceedings in Spanish courts seeking to lift the embargo on its airplanes obtained recently by Junkers Co. of Germany, which alleged infringement and similarity of Ford and Junkers all-metal planes.

One plane, which was en route to Spain when embargo was obtained, will be released under bond today, the Ford company states. Other planes shipped there in future will be delivered in same manner until the suit is settled, it is said.

Reports that the airplane division of Ford Motor Co. would get into maximum production shortly were denied as absolutely untrue by Robert Walker, secretary to William B. Mato, who is head of airplane division. Ford's airplane division now is producing one plane a week and has a payroll of about 375 men, it is said. Capacity in this division is five or six units a week.

Association Ends Meeting

NEW YORK, Jan. 20—With the determination to further develop its campaign featuring a more intensive servicing of the requirements of the trade and automobile owners in general, the National Wheel and Rim Association concluded a four-day convention at Chicago on Jan. 16. The four days were devoted to considering changed conditions in the wheel and rim branch of the automotive industry and in arriving at a program for the next year. Addresses were made by recognized authorities in the wheel and rim service field and in the automobile brake manufacturing and servicing business. Wesley D. Smith of the Motor Rim and Wheel Service of California, Los Angeles, was elected president, succeeding Fred Prior of Dallas.

To Make Diesel Engine

ALLIANCE, OHIO, Jan. 20—The Nash-Ohio Engine Co., of this city, has been incorporated with 250 shares of no par value and will begin production of a Diesel-type engine in a space leased in the plant of the Morgan Engineering Co. here. Incorporators are Charles A. Jacobson, Fred H. Demmel, John E. Everett and Milton C. Moore.

De Soto Corrects Price

DETROIT, Jan. 22—The price of the new De Soto roadster is \$985, according to an announcement from the advertising counsel of the Chrysler Corp. The statement that radio equipment is standard on the De Soto eight was characterized as being in error, by the same source.

Move Edison Lamp Works

HARRISON, N. J., Jan. 22—On or about March 1, the Edison Lamp Works of General Electric Co. will be established in its new quarters at Nela Park, Cleveland, Ohio.

Vehicle Output in 1929 Exceeded '28 by 999,602

WASHINGTON, Jan. 22—While total American production of motor vehicles in December, 1929, amounting to only 119,950 units, according to the Department of Commerce, was the lowest monthly output since February, 1922, with 117,871 vehicles, the 1929 aggregate established an outstanding record for all time, amounting to 5,358,361 units, exceeding by 999,602 the previous record made in 1928 with a total of 4,358,759 units. The 1929 record related to all the units, passenger cars, trucks and taxicabs. The passenger car output last year was 4,586,020, an increase of 764,884 over the 1928 production of 3,821,136, while truck production in 1929 was 754,752, a gain of 223,842 over the 1928 output of 530,842. Taxicabs to the number of 17,589 were manufactured last year as against 6713 in 1928.

The December, 1929, production showed a decrease of 97,620 under the 217,570 motor vehicles produced in November, and a drop of 114,166 under the 234,116 produced in December, 1928. Of the production last December, 91,234 units were passenger cars, the smallest volume since January, 1922, when this class of output totaled 80,194. In November, 1929, passenger cars to the number of 169,282 were produced. Truck production last December totaled 27,253 units, the lowest since January, 1928, with a total of 26,082. In November, 46,642 trucks were manufactured. There were 1483 taxicabs produced last December as against 1646 the preceding month.

Plan Giant Pageant

NEW YORK, Jan. 25—A pageant portraying progress in automotive engineering to be produced on 200 theatre stages, each of which will be twice as large as the stage of an ordinary theater, all housed in a gigantic building, has been proposed for the Chicago World's Fair in 1933, it was announced by Robert P. Shaw, secretary of the National Research Council's Science Advisory Committee, New York.

Fitz-John Announces Gain

MUSKEGON, MICH., Jan. 20—An increase of sales on approximately 17 per cent during the year 1929 over business done in 1928 has been announced by the Fitz-John Mfg. Co., manufacturer of motor coach bodies. An addition to the plant, containing 18,000 sq. ft. of floor space, has recently been completed. The company is now filling contracts for Reo, White and Studebaker, according to the announcement.

Oakland Announces Schedule

DETROIT, Jan. 22—The Oakland Motor Car Co. has announced a production schedule of 13,390 cars for January, which calls for 9879 Pontiacs and 3511 Oaklands, according to Gordon LeFebvre, vice-president in charge of operations.

Equipment Index Fell for 1929, M. & E. A. Shows

NEW YORK, Jan. 23—The original equipment index for the whole year 1929 published by the Motor and Equipment Association shows a marked falling off from the figures of 1928, while the service parts index shows a substantial gain, according to the Association. A summary of the Association's indices for the past three years follows:

Index	1929	1928	1927
Original Equipment...	191	199	150
Service Parts	154	155	135
Accessories	86	103	111.7
Service Equipment...	172.5	144	154.6
Grand Index	183	184	146

Original equipment manufacturers showed a marked falling off of business during December, due to the let-up in automobile production, according to figures just compiled by the Motor and Equipment Association. The original equipment index for December was 44, taking January business 1925 as 100, as compared with 78 in November and 164 in December a year ago. Accessory business during the month showed some improvement, registering an index of 90 as compared with 83 in November and 73 in December of 1928. Service parts also held up favorably during the month with an index of 132 as compared with 139 in November and 131 in December of the preceding year.

Service equipment held its own at 119 as compared with 115 in November and 120 in the previous December.

As a result of the decline in original equipment the grand index for parts and equipment business receded to 56 for December as compared with 90 in November and 151 in December of the previous year.

Wholesale business during December also showed somewhat of a decline as compared with November but still holding up as compared with the earlier months of the year. As against a 23-point drop in wholesaler business index, accounts receivable reported by wholesalers showed a decline of only 6 points, indicating a healthy situation as far as collections are concerned.

Wilcox-Rich Net is Up

DETROIT, Jan. 23—Net earnings of the Wilcox-Rich Corp. in 1929 are believed to have set a new high record in excess of \$1,400,000 after all charges, including depreciation and Federal taxes. Such net would be equivalent to \$21.86 a share on the 64,028 shares of Class A stock outstanding as of Sept. 30 last and to \$3.77 a share on the 328,620 shares of B stock after allowance for a full year's dividend on the A shares now outstanding. This compares with \$18.09 and \$3.03 respectively on the basis of the present capitalization in 1928, when net totaled \$1,158,299, heretofore a high record.

Houdaille-Hershey Earnings

CHICAGO, Jan. 21—Net earnings of Houdaille-Hershey Corp. for the 11 months ended Nov. 30, 1929, amounted to \$2,999,118, after all charges, including Federal taxes.

Rice and Johnson See Officials on Tariffs

WASHINGTON, Jan. 23—Following on the heels of telegraphic protests directed against the German and French increases in automobile tariffs addressed to Senators Couzens and Brandenburg of Michigan, made by 19 presidents of automobile companies, H. H. Rice, assistant to the president, General Motors Corp., and chairman of the taxation committee of the National Automobile Chamber of Commerce, came to Washington this morning and called on the Michigan Senators. He was accompanied by Pyke Johnson, Washington representative of the National Automobile Chamber of Commerce.

After interviewing the senators, Mr. Rice and Mr. Johnson visited Hugh Chalmers, chief of the Foreign Tariffs Division of the Department of Commerce. Among the protests filed was that of Edsel B. Ford, president of the Ford Motor Co., representing the largest automobile manufacturer outside the membership of the National Automobile Chamber of Commerce. Filing of Mr. Ford's protest resulted in the American automobile industry presenting a virtually united front against the proposed French and German tariff increases.

Light Weight Diesel Recent Product—Treiber

NEW YORK, Jan. 22—Pleasure boats of 100 ft. length and over have been powered with Diesel engines almost exclusively for more than 10 years but it is only since 1926 that light weight Diesel engines for fast boats have been developed. O. D. Treiber, of Treiber Diesel Engine Corp., told a joint meeting today of the Metropolitan Section of the Society of Automotive Engineers and the National Association of Engine Boat Manufacturers.

Up until 1926, 12 to 14 knots was about the limit of speed obtainable in Diesel-powered large pleasure boats. The essential elements of engines for fast boats are that they be small, of light weight, smooth in operation, simple in operation and absent of adjustments as far as possible.

Mr. Treiber went on to describe a number of such engines which have been developed by his company, stressing the use of light weight metals and weight-saving devices in their construction. He also showed a number of pictures of various Diesel engines developed by his company for motor boat use.

French Licks Gets S.A.E. Votes

NEW YORK, Jan. 23—Following a canvass of the membership of the Society of Automotive Engineers, the Council of the Society decided on Jan. 9 that the summer meeting would be held at French Lick Springs, Ind., May 25-29.

Marmon 9 Mos. Net Was \$727,010 to Nov. 30, '29

INDIANAPOLIS, Jan. 22—G. M. Williams, president of Marmon Motor Car Co., reports that notwithstanding that the company has written off entire cost of certain abnormal and extraordinary expenses aggregating \$1,500,000, net profit for nine months ended Nov. 30, 1929, was \$727,010 after charges and Federal taxes, equivalent after allowing for dividend requirements on 10,000 shares (par \$100) of 7 per cent preferred stock, to \$2.59 a share on 260,000 no-par shares of common stock.

Mr. Williams said that the unusual expense completely written off during this period included the extra cost of introducing the new Roosevelt car and becoming established in the \$1,000 field; the cost of developing a dealer organization which now numbers about 1500 dealers, more than double the number of Marmon dealers at the beginning of this period, and the expense incidental to the development and preparations for the entire line of Marmon motor cars just introduced to the public at the National Automobile Show in New York.

"As a result of these things, Marmon's potential earning position has never been more secure in its entire history, a very gratifying accomplishment," Mr. Williams said. "Our progress to date during the fourth quarter which will end with February and our very favorable order position at this time, indicate substantial earnings for the last quarter and a very good year. During 1930 the new line of Marmon cars, consisting of the Big Model Eight, model '79,' model '69,' and the Roosevelt have met with a very enthusiastic reception from Marmon dealers and the public."

Issue New Standards Code

NEW YORK, Jan. 23—A fourth edition has been issued of the Standards Adopted by the Compressed Air Society, which is published by the Society (C. H. Rohrbach, secretary), 90 West St., New York. It contains such new material as a new formula for air compressor testing, further suggestions in connection with the installation and operation of air compressors, a caution against the use of old boilers or tanks as air receivers and a suggestion for handling very cold cooling water so as to prevent condensation.

French Deny Cartel Report

PARIS, Jan. 20 (By Cable)—The story published in newspapers to the effect that automobile manufacturers in Germany, France, Belgium, Italy, Austria, and Czechoslovakia, in an effort to have American automobiles admitted into the respective countries on a contingent basis, is not true with regard to France. The French automobile manufacturers association and government officials deny that they have been a party to an action of this sort.

Miller Directors Vote to Merge With Goodrich

AKRON, Jan. 21—Directors of the Miller Rubber Co. today voted to accept the offer of the B. F. Goodrich Co. to purchase the assets and business of the concern. Nearly \$5,000,000 is involved in the transaction which was authorized by the executive committee of the Goodrich Co. This is the second merger in which Goodrich has participated within the last year.

Terms of the merger announced by Goodrich officials involve the transfer of 113,504 shares of Goodrich common stock. Goodrich will assume liabilities of the Miller Co., with the exception of dividend arrearages.

A special meeting of the Miller stockholders will be held on Feb. 17 for final approval of the deal. Sanction will require a two-thirds vote of each class of stockholders.

The Miller company is one of the oldest rubber manufacturing firms in the United States. Founded in 1892 by Jacob Pfeiffer, now chairman of the board of directors, the company rapidly expanded through its success in the sundry field. The business, which started in a frame shed, now occupies a plant with 30 acres of floor space and has a daily capacity of 10,000 tires. It holds 32 additional acres of land in the Kenmore district of Akron, which were to have been used for expansion.

The company has \$11,277,300 in 8 per cent cumulative preferred stock outstanding of an authorized issue of \$20,000,000. These shares have a par value of \$100. The common stock of no par value is listed as having 260,264 shares outstanding.

Committees representing the common and preferred stockholders of the Miller Rubber Co. could not reach a decision late tonight on apportionment of Goodrich stock to be divided in the merger with Goodrich. Committees representing both classes of Miller stock declined to say what the difficulty was that prevented reaching an agreement but said that further conferences would be held Thursday.

Dusenberg Reports Profit

CHICAGO, Jan. 20—Dusenberg, Inc., controlled by the Auburn Automobile Co., had a profit of \$84,055 in the year 1929, it is announced by E. L. Cord, president, in a letter to stockholders. Mr. Cord states that these earnings were shown despite the fact that in the first six months the company had a loss of over \$107,000.

Marmon Shows New Line at Detroit Exhibit

DETROIT, Jan. 23—The new Marmon Roosevelt in four body models, the price on three of which has been increased \$80, is being exhibited at the Detroit Automobile Show this week. Changes in body design bring the car closer to the ground, and the fenders are larger and stronger. The tire size has been increased to 5.50, while the hood is typical of the larger Marmon cars. The chassis remains the same.

Changes in the engine provide an increase of 7 hp. over the previous models. An air cleaner is provided with the increased process.

There is only one model now listing at less than \$1,000, the two-passenger coupe, the price on which remains unchanged at \$995. The new prices on the other three models after the \$80 increase in each are: five-passenger sedan, \$1,075; four-passenger victoria, \$1,145; convertible coupe, \$1,175.

Detroit Forging Net Gains

DETROIT, Jan. 23—The Detroit Forging Co. for the year ended Dec. 31, 1929, will report the largest net income in its history, according to officials of the company. It is estimated that the final figures will show net of approximately \$102,000 after all charges and taxes equivalent to around \$2.05 a share on the outstanding capital stock. This would compare with net income of \$80,547 or \$1.65 a share on the old Class A stock for the year ended Dec. 31, 1928. In 1927 the company had a net loss of \$11,109. Current operations are somewhat ahead of December and officials anticipate continued improvement during the coming weeks.

Michigan Plans Expansion

DETROIT, Jan. 23—Michigan Steel Corp., manufacturer of sheet metal, has approved a plan for plant expansion involving not less than a 30 per cent increase in capacity. Unofficial estimates of net in the neighborhood of \$8 a share on the 220,000 shares of common stock imply a record net of roughly \$1,700,000 in the year ended Dec. 31 last, maintaining a seven-year record of successive gains. Such a showing would compare with \$1,049,902 or \$4.77 a share in 1928, heretofore a record year, and with 69,850 in 1923, the first year of operation.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, Jan. 22—Trade throughout the country last week was again curtailed by adverse weather. In some sections it was abnormally warm, while in others severe cold and heavy snows interfered with transportation. Trade in the wholesale and jobbing lines was also slow.

CHAIN STORE SALES

Sales of 48 store chains in December totaled \$336,120,299, which marks an increase of \$46,711,291, or 16.14 per cent, above those in the preceding month. Total sales of these same store chains for the year were 24.22 per cent above those in 1928.

FARM PRICES

The level of farm prices on Dec. 15, according to the index of the United States Department of Agriculture, stood at 135 per cent of the pre-war figure, as compared with 136 on Nov. 1 and 134 a year ago.

FREIGHT CAR LOADINGS

Railway freight loadings for the week ended Jan. 4 totaled 776,259 cars, which marks a decrease of 22,423 cars below those a year ago but an increase of 22,012 cars above those two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Jan. 18 stood at 93.2, as against 93.1 a week earlier and 93.0 two weeks earlier.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended January 15 were 11 per cent below those in the corresponding week last year.

STOCK MARKET

The stock market last week continued dull, with the volume of trading at a low level and with irregular price movements. The general trend of prices, however, was downward, since some weakness developed toward the end of the week. The money situation had no apparent influence on price movements. Call money ranged from 4 to 4½ per cent.

BROKERS' LOANS

Brokers' loans in New York City for the week ended January 15 increased \$13,000,000, bringing the total up to \$3,365,000,000, as against \$5,395,000,000 a year ago.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Jan. 15 showed decreases of \$126,000,000 in holdings of discounted bills and of \$6,000,000 in holdings of Government securities. There was an increase of \$4,000,000 in holdings of bills bought in the open market. The reserve ratio on Jan. 15 was 75.4 per cent, as against 72.9 per cent a week earlier and 69.6 per cent two weeks earlier.

Financial Notes

Company	Remarks
Atlas Imperial Diesel	net prof. yr. end. Nov. 1929, \$530,097, \$3.27/sh.; pcd. yr. \$447,399, \$3.31/sh.
De Havilland Aircraft	net prof. yr. end. Sept. 30, \$237,020, 78 cts./sh. 1928 earn. \$95,868.
Douglas Aircraft	init. div. 75 cts. cap. stock, March 19 rec. Feb. 7.
Electric Auto-Lite	earn. 1929, \$11,500,000, \$12/sh., 1928 earn. \$778,818, \$8.60/sh.
Hudson Motor Car Co.	reg. quar. div. \$1.25, April 1, rec. March 11.
International Harvester ..	reg. quar. div. \$1.75 prf., March 1, rec. Feb. 6.
Kelsey-Hayes Wheel	reg. quar. div. \$1.75, prf. Series KH, Series WW, Feb. 1.

Men of the Industry and What They Are Doing

Lawrence Returns to Europe

NEW YORK, Jan. 22—John V. Lawrence, European representative of the National Automobile Chamber of Commerce, who returned to this country to attend the National Automobile Show, sailed today to return to his post in Europe. Mr. Lawrence planned when he came back to spend several weeks here, visiting the industry in this country, before he returned to his post, but recent developments in France and Germany have made it seem advisable for him to return immediately so that he may observe what is taking place in the European situation.

Cincinnati Advances Two

Announcement has been made of the advancement of Walter W. Tangeman from the position of general sales manager of the Cincinnati Milling Machine Co., Cincinnati, to the post of vice-president. Mr. Tangeman has been affiliated with the company since 1909, when he began his cooperative schooling at the University of Cincinnati.

The appointment of Frederick B. Heitkamp as general sales manager to succeed Mr. Tangeman has also been announced. Mr. Heitkamp has been associated with the company since 1921, and was formerly assistant sales manager.

Swain Joins Goodyear

J. G. Swain, former vice-president of the Firestone Steel Products Co., rim manufacturers, has been made head of the Goodyear Rim Sales Department.

Mr. Swain was 13 years with the Firestone organization. R. S. Burdette, former manager of rim sales, becomes assistant manager of the department, and will continue in his activities in the field on rim sales.

Rasche Leaves Oakland

William F. Rasche has resigned as director of educational work at the Oakland-Pontiac division of General Motors, effective Jan. 15, to accept the appointment as principal and assistant director of the Milwaukee Vocational School.

Northrop Leaves Willys

Amos E. Northrop has left the Willys-Overland Co., where he was chief designer, and has become chief designer of the Murray Corp. of America and consulting engineer for Dietrich, Inc.

Taft-Peirce Appoints Reynolds

Hal W. Reynolds has been appointed factory representative for the Cleveland territory by the Taft-Peirce Mfg. Co., Woonsocket, R. I., according to an announcement made by the company.

Knudsen Talks to Chevrolet Dealers

"A satisfied customer is the best salesman of any product," declared W. S. Knudsen, president and general manager of the Chevrolet Motor Co., in stressing the idea of giving good service, to 700 Chevrolet dealers in this territory at the annual sales meeting in St. Louis last week. Mr. Knudsen said Chevrolet sales in the St. Louis district were 250 per cent greater in the first 10 days of January than in the same period last year. Officers of the 100 Car Club were installed during the meeting, which was the second of a series of 42 being held throughout the country by the Chevrolet organization.

Loomis is on Tour

Edward F. Loomis, secretary of the Motor Truck Committee of the National Automobile Chamber of Commerce, is making a trip through the mid-west to carry on work among truck operators. While he is away Mr. Loomis will speak before the Ohio Association of Commercial Haulers at Columbus and the Truck Association Executives of America at Cleveland.

Scott Heads Bank

Richard H. Scott, president and general manager of the Reo Motor Car Co., has been made president of the City National Bank of Lansing, succeeding Benjamin F. Davis who has been elected chairman of the board of directors. Mr. Scott formerly was a vice-president of the bank.

Pohl Returns to U. S.

William M. Pohl, president of the Kepec Co., Milwaukee, manufacturer of lacquers, finishes, etc., has recently returned from a 6 months' visit abroad, during which time he established a fifth foreign branch factory, in Czechoslovakia.

Mooney Joins Campbell Agency

Frank J. Mooney has been appointed to the copy staff of the Campbell-Ewald company, according to an announcement made by H. T. Ewald, president of the company. Mr. Mooney comes from the D'Arcy Advertising Co., Inc., St. Louis, where he was in charge of the Gardner and Moon accounts. For several years he was advertising manager and later sales manager for the Hupp Motor Car Corp.

Pletz Changes Positions

Arthur C. Pletz has resigned as assistant general sales manager of the Pratt & Whitney Co., Hartford, to become works manager for Aluminum Industries, Inc., Cincinnati.

Van Duzer Heads Road Men

ATLANTIC CITY, N. J., Jan. 22—The selection of W. A. Van Duzer of Harrisburg, assistant chief engineer of the Pennsylvania Department of Highways, as president of the American Road Builders' Association for the ensuing year, was formally ratified Jan. 17.

Mr. Van Duzer and the other officers nominated for the new year will be installed at the Washington conference in May.

Stout Elects Rentschler

F. B. Rentschler was chosen chairman of the board at a meeting in Dearborn this week of Stout Air Services, Inc., operator of the Stout air lines between Cleveland and Detroit and Chicago. Mr. Rentschler is president of the United Aircraft & Transport Corp., of which the Stout company is a subsidiary.

Officers selected included William B. Stout, president; William B. Mayo, vice-president; Stanley E. Knauss, vice-president and general manager, and Donald J. Rogers, secretary. The new board includes Charles T. Bush of Detroit, Mr. Stout, Mr. Mayo and Mr. Knauss.

Aircraft Products Adds Three

Addition of three men, two in the engineering and one in the sales department of the Aircraft Products Corp., Detroit, has been announced by Ralph R. Irwin, president. Otto Ferrill, formerly of New Orleans, and a war-time pilot, will represent the company with manufacturers all over the country. H. F. Budzine, Detroit, formerly with the Waco Aircraft Co., Verville Aircraft Co. and the Detroit Vercraft Corp., is a new addition to the engineering department. Alf Heum, a graduate of the Ecole Supérieure d'Aéronautique, and formerly with Fairchild and Chance Vought, will assist in the engineering department.

Baldwin Executives Shift

N. Bradley Higbie, Jr., and C. B. Myers were elected Jan. 21 to the board of directors of the Baldwin Rubber Co., maker of rubber floor mats. Mr. Myers was also made vice-president in charge of sales, having previously been sales manager. N. B. Eldred, Jr., secretary, was elected treasurer, succeeding Mr. Talbot in that position.

Willys Resigns Bank Post

John N. Willys has resigned as a director and vice-president of the First National Bank of Toledo, because his absence from the city prevented his being present at directors' meetings.

New French Tariff Bill Has Drastic Increases

PARIS, Jan. 20 (By Cable)—The bill introduced in the French Chamber of Deputies, substituting specific for the present ad valorem duties on complete automobiles, states in its preface that it is an administrative rather than a fiscal change, designed to secure continuance of the present rate on automobiles without any of the inconveniences of the former system.

The minimum levy under the new bill, would be 850 fr. per 100 kg. for passenger carrying automobiles weighing less than 950 kg., 925 fr. on automobiles weighing between 950 to 1300 kg., 1100 fr. for those weighing from 1300 to 1500 kg., 1300 fr. for those weighing from 1500 to 1800 kg., and 1750 fr. per kg. for those weighing over 1850 kg. Chassis without bodies mounted, or with or without engines, would be assessed at the same rates. Trucks with or without bodies would be taxed at the rate of 750 fr. per 100 kg.

Fiat, the only firm importing cars weighing less than 950 kg. into France, claims that the new scale would represent an increase of more than 100 per cent over the present tariff. The increase on the Chevrolet truck would amount to 87 per cent; on the Chevrolet sedan, 65 per cent; Oldsmobile sedan, 67½ per cent; Oakland sedan, 70 per cent; small Buick sedan, 91 per cent; large Buick sedan, 123½ per cent.

Assurance has been given by the French government that opportunity will be granted for discussing the bill in the Chamber. Opportunity has also been provided for a deputation of the American automotive industry in France to present its case before the tariff commission. The bill is undoubtedly directed against American industry and the legislators responsible for drafting it appear to have acted in ignorance of recent concessions in tariff by the American government, and under belief that the new American tariff will be disadvantageous to French industry.

Blair Succeeds Evans

DETROIT, Jan. 21—Following a Board of Directors meeting yesterday, of the Detroit Aircraft Corp., E. S. Evans, president, announced that Harold H. Emmons had resigned as chairman of the board of directors of the company and that Frank W. Blair, chairman of the board of directors of the Union Trust Co., Detroit, had been elected as Mr. Emmons' successor.

Develops Fast Fighting Plane

SEATTLE, Jan. 22—The world's fastest fighting airplane, one which can fly in excess of 200 miles an hour and climb to an altitude of six miles, has been developed by the Boeing Airplane Co., local officials announced today. The Boeing Model 100, powered with a 425 hp. Wasp engine, is a staggered biplane built to air service specifications and has an upper wing span of 30 ft.

Milwaukee Leads in Cars to Family

MILWAUKEE, Jan. 20—Statistics compiled by the National Exchange Bank of Milwaukee indicate that Milwaukee leads all cities of the United States in the number of cars owned per family. Approximately 101 cars are owned for each 100 families. St. Louis is next with 87; Des Moines, 86; Cleveland, 84; Kansas City, 83; Boston, 74; Philadelphia, 59; Chicago, 57, and New York, 49. These comparisons are derived from registration figures issued by the National Automobile Chamber of Commerce and the number of families in each area as computed from the latest U. S. Census Bureau estimates of population.

Cummins to Enter Diesel

COLUMBUS, IND., Jan. 22—A racing car powered by a high speed Diesel engine will be entered in the 500-mile Indianapolis race on Memorial Day, according to announcement by C. L. Cummins, Cummins Engine Co., Columbus, Indiana.

"Our engine will be of six-cylinder type and will have piston displacement of almost the maximum of 366 cu. in. It will incorporate many unusual features of design for an internal combustion engine and will run much faster than ordinary Diesel engines," said Mr. Cummins in commenting on his proposed entry.

Capt. E. V. Rickenbacker, president of the Indianapolis Speedway, expressed his hearty approval of the entry. He called attention to the fact that new rules for the Indianapolis classic were purposely made favorable to Diesel, two-cycle and turbine powerplants.

Klein Praises Industry

WASHINGTON, Jan. 24—Warm tribute to the automotive industries for their contribution to the economic wealth and comfort of the country during the past decade was paid by Dr. Julius Klein, assistant secretary, Department of Commerce, in a radio talk on "Commercial Triumphs of the Nineteen-Twenties" last Saturday night when he pointed out that there are more than three and one-half times as many automobiles on the American highways now as there were 10 years ago. At present, it was stated, five of the states, New York, California, Ohio, Illinois and Michigan, ranking in the order named, have nearly 1,000,000 more motor vehicles than existed in the entire nation as recently as 1920.

Newark Show Has Gain

NEWARK, N. J., Jan. 18—Attendance at the 23rd annual Newark automobile show, held here in the 113th Regiment Armory, has run approximately 28 per cent ahead of last year, according to Claude Holgate, manager.

General Motors Plans New Securities Group

NEW YORK, Jan. 20—General Motors Corp. has acquired approximately 1,000,000 shares of its own common stock at a cost of approximately \$35,000,000, with the intention of selling it to a Second Managers Securities Co. to be formed to take the place of a similar company now in existence. Directors of the corporation will meet some time in the near future to formulate details and these details will subsequently be referred to stockholders for ratification.

The existing Managers Securities Co. expires under its charter terms in 1931 but, while definite plans have not yet been formulated, it is believed that the new company will begin operations this year and that the existing company will then automatically pass out of existence.

The existing company was organized in 1923 for the purpose of permitting men occupying key positions to become stockholders and to share directly in profits accruing as a result of their efforts. Approximately 80 executives of the corporation are participants in the existing company. The corporation aids such participants by paying to the company each year 5 per cent of its excess net earnings over and above 7 per cent of the net capital employed.

Adams Heads Plane Sales

DETROIT, Jan. 18—It has been decided, after a sales meeting held in the Detroit office of the Detroit Aircraft Corp. on Jan. 1 to realign sales divisions throughout the United States. B. D. Adams will be acting general sales manager and will direct the activities of the department. John Nulsen, general manager of the Ryan division, will be in charge of sales in the Central district for Ryan. Ray W. Brown will handle sales of Parks, Lockheed, Eastman Flying Yacht and Gliders in the Central territory. Carl B. Squier, general manager of the Lockheed division, will be in charge of Lockheed sales in the Western district and Ted Schluefer will be Western district sales manager for all other Detroit Aircraft products. C. R. Norton, Eastern sales representative, will handle sales of all products in the New York district, and L. J. Robinson will represent the sales organization in the Southeastern part of the United States.

Glancy Foundry Adds

WAUKESHA, WIS., Jan. 20—New specifications for castings from General Motors divisions and other customers has enabled the Glancy Malleable Co. to add 75 hands, bringing the payroll to 400, which is equivalent to 100 per cent capacity of the old plant. A new shipping building was recently completed and a foundry extension will be finished about Feb. 15, when additional workmen will be taken on as business requires, according to the announcement of the company.

Airplane Output Gained 51 Per Cent During 1929

NEW YORK, Jan. 22—Ninety-six major aircraft manufacturers produced 6034 commercial and military airplanes during 1929, according to figures announced today by the Aeronautical Chamber of Commerce of America, Inc. These figures will be included in the Aircraft Year Book for 1930, which the Chamber expects to have ready for distribution Feb. 15. Total value of these planes without engines is placed at \$44,457,300. Commercial airplanes produced during the year showed an increase of 51 per cent over 1928.

The report shows that open cockpit biplanes led all others in the number produced, while monoplanes showed an increase over 1928, registering a gain of 363 per cent. Multi-engined monoplanes increased 207 per cent over 1928, flying boats and seaplanes 190 per cent, open cockpit monoplanes 81 per cent, enclosed cockpit monoplanes 80 per cent, multi-engined biplanes 60 per cent, and open cockpit biplanes 30 per cent. Closed cockpit biplanes decreased 32 per cent as compared with 1928. An increase in interest in monoplanes is evidenced by the fact that in 1928 there were 124 per cent more biplanes than monoplanes produced, while in 1929 these figures were only 51 per cent. Twenty-five engine manufacturers produced a total of 7378 engines for both military and commercial use, representing a total valuation of \$26,495,830.

Develop New Accessory

SIOUX CITY, IOWA, Jan. 20—A coach bed, invented by H. R. Graham to serve small town physicians where no ambulance was available, has been developed into a camper's specialty and is being manufactured by the Kari-Keen Manufacturing Co. Mr. Graham has been making the accessory in his own plant in Miller, S. D., but has joined the Kari-Keen staff to supervise the new line manufacture.

Janesville Plants Active

JANESVILLE, WIS., Jan. 20—Although operating on no fixed schedule for January, the Janesville (Wis.) plant of Chevrolet is producing about 450 cars a day, according to Ellery L. Wright, factory manager. All departments were in operation by the middle of the month. The Chevrolet payroll numbers 1000, including the office force. The local Fisher body plant has about 800 at work. At the peak in 1929 the two plants had about 2500 at work.

Bendix Gets Large Order

CHICAGO, Jan. 22—The Bendix Aviation Corp. has received orders for airplane parts and accessories from the Stinson Aircraft Corp., according to Vincent Bendix, president. The order embraces 500 Scintilla magnetos, 500 Stromberg carburetors, 500 Bendix aviation-type brake sets, 300 sets of Eclipse electric starters and 300 sets of Pioneer aviation instruments.

Ford Lets Contract for Cologne Plant

COLOGNE, Jan. 20—A contract signed in October between the Mayor of Cologne and the Ford Motor Co. providing for the establishment of an automobile plant here was ratified today.

The Ford company has ordered Edmund Koerner, Essen architect, to begin the construction of quays and workshops at a total cost of \$1,000,000.

Rubber Market Revives

NEW YORK, Jan. 22—Activities on the part of Dutch and British rubber producers in the way of discussion for price maintenance plans have revived speculative buying in the crude rubber market, according to the F. R. Henderson Corp. Stocks of crude rubber in London have been increased to 58,990 tons, with Liverpool stocks up to 19,640 tons. Arrivals of crude rubber at all ports of the United States during the first 16 days of the year are estimated at 25,200 tons.

Earl Cam Engine Tested

PORTLAND, ORE., Jan. 20—Built on the principle of using a circular cam in place of the customary crankshaft to convert the power of exploding gas into a rotary motion, the second model of the Earl aircraft engine, designed and constructed by Harry W. Earl, Portland, has met factory tests. Weight of the engine is now but one pound per horsepower. The engine measures 24 in. in diameter, including the radiator drops within the streamlining of the fuselage.

Wisconsin Sales Gain

MILWAUKEE, Jan. 20—Final figures on new car sales in Wisconsin during 1929, as revealed by the new car registrations for individual owners' licenses, show that passenger car business for the year was approximately 16 per cent greater than in 1928, and established a new high yearly record for the state. The total new car sales in 1929 were 103,850, compared with 87,453 in 1928, and 78,321 in 1927. All of the gain was registered in the first nine months of 1929.

Lakeside Absorbs Wisconsin

MILWAUKEE, Jan. 20—The Lakeside Malleable Castings Co., Racine, Wis., the principal part of whose business is with the automotive and power farm machinery industries, has increased its capital stock from \$100,000 to \$200,000, for additional working capital and to finance plant expansion. The Lakeside company several months ago took over all production of the Wisconsin Malleable Iron Co., Milwaukee, following the destruction of its foundries by fire. To some extent the two interests were identical and they now have been made completely so.

Bachman Tells Service Men of Truck Progress

NEW YORK, Jan. 20—Taking as his theme the quotation from Bruce Barton, "When we're through changing we're through," B. B. Bachman, vice-president in charge of engineering of the Autocar Co., outlined to the Automotive Service Association of New York at a meeting held Jan. 16, the changes that have developed during the past 10 or 15 years in the truck industry, and touched upon factors of today which will bring about further changes in the future.

Recent changes have been influenced by three things, Mr. Bachman pointed out: First, the development of pneumatic tires, which have permitted the greater speeds now comparable with speeds formerly obtainable only in passenger cars; Second, traffic conditions, which have necessitated greater power for quick getaway and more efficient brakes for quick stops; and Third, the development of good roads. These three factors have made possible the present day conception of heavy-duty high-speed transportation.

Customs Decision Made

WASHINGTON, Jan. 24—Firms allowing freight in the United States may also allow it to Canadian customers without making Canadian shipments subject to dumping duty, according to a customs decision recently announced by the Canadian Commissioner of Customs, says a report received by the Department of Commerce from Commercial Attache L. W. Meekins, Ottawa. The dutiable value will be the Canadian selling price plus freight allowance and the Canadian importer will remit the selling price minus freight allowance. Another decision was to the effect that if the cash discount in the United States is only 1 per cent, it cannot be more than that in Canada without the application of dumping duty. If the cash discount in the United States is 5 per cent, the maximum in Canada is 2½ per cent.

Sparta Foundry Adds

DETROIT, Jan. 20—An addition to the plant of the Sparta Foundry Co., of Sparta, Mich., was announced following the annual meeting of stockholders here Wednesday. The addition, which will be 100 ft. by 100 ft., is practically completed and will be in operation within a month. Production will be increased approximately 60 per cent by the addition. A. A. Johnson was elected chairman of the board.

Cadillac Takes Distributorship

MILWAUKEE, Jan. 20—August A. Jonas, since 1902 territorial representative of the Cadillac in the Milwaukee district, has announced his retirement from the trade and the disposition of the Jonas Cadillac Co. to the Cadillac division of General Motors, which will continue the business as a direct factory branch, serving the entire state of Wisconsin.

November Tire Output Fell, Inventory Gained

NEW YORK, Jan. 20—Despite decreased production of tires, tubes and casings during November of last year, inventories of all types of casings and tubes show an increase over October, according to statistics just published by the Rubber Manufacturers Association and based on information representing approximately 75 per cent of the total of the American industry. Inventories of casings also show an increase as compared with November of the previous year, but tube casings show a slight decrease in inventory as compared with the previous year. Comparative figures follow:

Pneumatic Casings, All Types

	Inven- tory	Produc- tion	Ship- ments
Nov. 1929.....	9,701,415	2,702,577	2,688,319
Oct. 1929.....	9,633,404	3,689,184	3,719,757
Nov. 1928.....	9,434,003	4,556,094	3,748,692

Inner Tubes, All Types

Nov. 1929.....	10,275,993	2,835,314	2,783,880
Oct. 1929.....	10,241,900	4,000,283	3,751,078
Nov. 1928.....	11,806,916	4,194,230	3,751,157

Balloon Casings

Nov. 1929.....	7,364,873	1,923,296	1,924,073
Oct. 1929.....	7,332,047	2,728,113	2,658,907
Nov. 1928.....	6,192,556	2,875,529	2,430,203

Balloon Inner Tubes

Nov. 1929.....	8,990,953	1,745,533	1,870,927
Oct. 1929.....	7,121,095	2,386,892	2,475,005
Nov. 1928.....	6,887,159	2,268,410	2,238,347

High Pressure Cord Casings

Nov. 1929.....	2,313,743	774,620	737,920
Oct. 1929.....	2,275,990	952,347	1,052,969
Nov. 1928.....	3,197,060	1,664,024	1,305,186

High Pressure Inner Tubes

Nov. 1929.....	3,264,933	1,088,037	910,444
Oct. 1929.....	3,103,336	1,610,942	1,274,129
Nov. 1928.....	4,952,973	1,929,320	1,512,810

U.C.C. Reviews Progress

DETROIT, Jan. 20—The time sales financing operations of Universal Credit Co., which provides the authorized Ford finance plans for the purchasers of Ford products, has completed the first full year of business. An official of the company in commenting on the progress of the organization said:

"Less than two years ago this business was in the formative stages. During only 18 months of operation, Universal Credit Co. has purchased over 500,000 time sales transactions on which the deferred balances totaled \$200,000,000.

"Universal Credit Co. has 25 complete branches in operation which serve over 5300 Ford dealers in the 35 states in which we are now doing business."

Owen Dyneto Has Good Year

DETROIT, Jan. 20—The Owen Dyneto Corp. of Syracuse, N. Y., has just completed the most successful year in its history, with a total output of over four million electric windshield wipers, according to Floyd W. Adams, sales manager. Of the total amount produced, the Ford Motor Co. absorbed between two and one-half to three millions, the remainder being distributed to other motor car manufacturers.

National Air Races Slated for Chicago

WASHINGTON, Jan. 20—The 1930 national air races will be held in Chicago early in September, Senator Hiram Bingham, president of the National Aeronautic Association, announced today. The award of the annual races to Chicago was made by the association's contest committee, of which Orville Wright is chairman. The only other serious contender for the races was Springfield, Mass.

British Track Planned

LONDON, Jan. 9—The newly formed Automobile Racing Association has applied to the Government for permission to construct a speedway along the foreshore between Boston and Skegness (Lincolnshire). It is proposed to build a main track from 12 to 15 miles long, flat, dead straight and 600 ft. wide with a non-skidding surface. Alongside it will be another reproducing the corners and curves of famous road racing circuits. There will also be a motor boat waterway, a mile long and 900 ft. wide, running parallel with the speedway, and grandstands for spectators stretching four miles along the middle section of the course. The roughly estimated cost of the scheme is between £600,000 and £1,000,000 and two years' work would be needed to complete it.

Settle Murray Tax Suit

DETROIT, Jan. 20—As a result of the efforts of the Murray Corp. of America to clear up the matter of old tax claims against its predecessor company, the former Murray Body Corp., and subsidiaries, \$323,029.95 is to be paid the Government by the Guardian Trust Co., Detroit, acting as receiver for the former company.

The present Murray Corp. of America, which assumes the obligation, set up an ample reserve on its books several years ago, more than enough to take care of the claim. An order for payment on taxes of the former company between 1917 and 1925, which was the year it entered receivership, was issued this week by Federal Judge Charles C. Simmons.

Reports Fewer Accidents

PONTIAC, MICH., Jan. 20—Accidents involving lost time in the Oakland-Pontiac plants during 1929 were 24 per cent less than those in 1928, according to a report just issued by W. D. Thompson, safety director of the Oakland Motor Car Co. There were 217 lost-time accidents in 1929, Mr. Thompson reported, as against 279 the previous year. Increased activity of the company last year involved nearly 2,000,000 more man hours of labor than in 1928.

Chevrolet Expects Sales to Pass January, 1929

DETROIT, Jan. 20—Chevrolet will sell more cars this month than in January a year ago, according to H. J. Klingler, vice-president and general sales manager of the Chevrolet Motor Co., who announced last Saturday that the month's schedule had to be increased in response to the greatest reception a new Chevrolet model has received in the 19-year history of the company.

That the step-up in the schedule resulted directly from the number of orders taken for the new car when it made its public bow, rather than upon an estimate of the month's requirements, is indicated in a statement from the Chevrolet sales executive:

"Our policy for some time," Mr. Klingler explained, "has been to key our production facilities to the anticipated needs of our sales organization so that dealers might not become overstocked. On this basis we set our January schedule to parallel the sales forecast, but so many dealers, upon noting the public attitude toward the new car, have asked to have their quotas increased that our output for the month will now exceed the figure for last January."

Auburn Shipments Gain

AUBURN, IND., Jan. 20—Shipments and production by the Auburn Automobile Co. are running well in excess of last year. R. H. Faulkner, vice-president in charge of sales, announced today that 629 cars were shipped from the Auburn factories in the first 13 days of January, which compares with 395 cars shipped in the first 15 days of a year ago, an increase of 59 per cent. In January, 1929, a total of 1262 cars were shipped, whereas the schedule this year calls for an output of 1500 cars for the month.

Tyson Locates in Ohio

MASSILLON, OHIO., Jan. 20—The Tyson Roller Bearing Co., founded by Frank Tyson, of Canton, mechanical expert and veteran inventor, and financed by a group of New York industrialists and financiers, will locate its plant here. C. E. Stuart, of Massillon, former president of the Central Alloy Steel Corp., is president of the company. A site of 15 acres has been optioned, and plans for the factory buildings are now being drafted. It is expected operations will be started within three months.

Portland Section Meets

PORTLAND, ORE., Jan. 20—The newly organized Portland section of Society of Automotive Engineers at their monthly meeting had as speakers George P. Texada of the Standard Oil Co., who discussed "Lubrication"; Vance Breese, president of Breese Aircraft Corp., who spoke on "Theory Performance Versus Actual Performance of Breese Mail Plane," and Professor F. G. Braender, "Diesel Engines."

Auburn Doubles Earnings, Annual Report Indicates

AUBURN, IND., Jan. 20—The Auburn Automobile Co., with per share earnings double those of the previous year, established a new high profit record in 1929. The annual report issued last night reveals that net income for the year ended Nov. 30, 1929, totaled \$3,603,200, which, after all deductions and charge-offs, equaled \$21.23 a share on the 169,686 shares of capital stock outstanding. This compares with \$1,523,290 or \$10.77 a share on 141,450 shares of stock in the preceding year.

As a result of the growth in sales of Auburn cars, and the introduction of two entirely new lines under the Duesenberg and Cord names, the company's net sales increased 57.61 per cent. The operating profit was 81 per cent greater than the previous year. The balance sheet of the company shows current assets of \$13,326,865 compared to current liabilities of \$3,295,922.

Show Sales Were Good

NEW YORK, Jan. 20—Twenty-five local dealers assisting in the national show here report over 900 actual sales made at the show, with 14,000 potential prospects, according to the survey just completed by the Automobile Merchants Association of New York. Accompanying the reports turned in to the association by the dealers is a detailed account by each one which reveals the results of actual contacts with an optimistic buying public. Comparison with previous shows indicate larger net sales, more prospects and less evidence of curiosity seekers visiting the show. Sales were well distributed through all price ranges of cars.

Show Space Sold Out

DETROIT, Jan. 20—All available space for the All-American Aircraft Show to be held here April 5 to 13, has been sold, according to Ray Cooper, manager.

"Automotive Industries" Show Week Calendar

CHICAGO SHOW WEEK EVENTS

Jan. 25—Studebaker Corp. Banquet. Palmer House
Jan. 28-29—Automotive Electric Assn. Convention. Stevens Hotel
Jan. 28—Graham-Paige Luncheon. 1:00. Palmer House
Jan. 28—Oakland Motor Co. Banquet. 6:30. Palmer House
Jan. 29—Willys-Overland Banquet. 6:30. Palmer House
Jan. 29—Chrysler Sales Corp. Luncheon. 12:30. Congress Hotel
Jan. 29—Natl. Assn. of Automobile Show & Assn. Managers Luncheon. 12:30. Stevens Hotel

Willard to Sell Radio

CLEVELAND, Jan. 20—Announcement has been made by C. Russell Feldmann, president of the Automobile Radio Corp., that a merchandising arrangement had been effected between the company and Willard Service Stations, whereby this nation-wide sales and service organization would be available to motorists for the sale, installation and service of Transitone, the automobile radio.

Installs Stamping Press

MILWAUKEE, Jan. 20—The Federal Pressed Steel Co., Milwaukee, has just completed the installation of a 1000-ton stamping press, said to be the largest of its kind ever built, at a cost of upwards of \$40,000. The press has an overload capacity of 1200 tons. It weighs 145,000 lb. and is 31½ ft. high, of which 9½ ft. is below the floor surface.

Pays Third Dividend

ROCK ISLAND, ILL., Jan. 20—The Bear Manufacturing Co., 2030 Fifth Avenue, paid a 10 per cent dividend to its stockholders last week, the third one of that size declared within a year. The company manufactures precision tools for automobile axle and wheel alignment.

Newman Heads Company to Make Exhaust Device

NEW YORK, Jan. 20—Carbon Monoxide Eliminator Corp., recently organized as the sole licensee under patents involved in the discovery of Dr. J. C. W. Frazer of the Department of Chemistry of Johns Hopkins University of a catalyst which will involve the elimination of carbon monoxide from the exhaust fumes of internal combustion engines, has announced the following officers:

J. H. Newman, who has long been associated with the automotive industry in an advertising capacity and was for many years identified with General Motors, is president of the new company; John T. Ryan is vice-president, George H. Deike is treasurer and E. H. Kellogg is secretary. Offices have been established in New York and Pittsburgh. The development of this catalyst was described in *Automotive Industries* of Jan. 11.

Reorganize Tire Company

BIRMINGHAM, Jan. 20—The Birmingham Tire and Rubber Co. has been reorganized under the name of the Birmingham Rubber Products Co. and in the future will manufacture mechanical rubber goods as well as tires and tubes. New equipment and improvements are being provided at the North Birmingham plant and operation will begin March 1.

Douglas Aarant is president and Joseph F. Keuch, formerly with the Kokomo Tire & Rubber Co., of Kokomo, Ind., is general manager, and A. H. Stearns, formerly with the New York exporting branch of U. S. Tire & Rubber Co., is sales manager.

General Bumper Gets Order

CHICAGO, Jan. 20—General Spring Bumper Corp., a division of the Houdaille-Hershey Corp., has obtained a contract for new business which should approximate \$2,000,000, it has been announced by Claire L. Barnes, president.

Calendar of Coming Events

SHOWS

Rochester, Automobile	Jan. 20-25
Nashville, Automobile	Jan. 20-25
Wilmington, Del., Automobile	Jan. 20-25
Paterson, N. J.	Jan. 20-25
Chicago National Coliseum	Jan. 25-Feb. 1
Washington, D. C., Automobile	Jan. 25-Feb. 1
Cleveland Automobile Show	Jan. 25-Feb. 1
Copenhagen Trucks, etc.	Jan. 25-Feb. 2
Portland, Me., Automobile	Jan. 27-Feb. 1
Wilkes-Barre, Automobile	Jan. 27-Feb. 1
Hillsdale, Mich., Automobile	Jan. 28-Feb. 1
Lancaster, Pa., Automobile	Jan. 28-Feb. 1
San Francisco, Cal., Automobile	Feb. 1-8
Minneapolis-St. Paul, Automobile	Feb. 1-8
Toledo, Ohio, Automobile	Feb. 3-8
Wichita, Automobile	Feb. 3-8
Cumberland, Automobile	Feb. 3-8
Syracuse, Automobile	Feb. 3-8
Ottawa, Automobile	Feb. 3-8
St. Louis, Automobile	Feb. 3-8
Elgin, Ill., Automobile	Feb. 5-8
Cincinnati, Aircraft	Feb. 8-14
Albany, Automobile	Feb. 8-15
Akron, Automobile	Feb. 8-15
Kansas City, Automobile	Feb. 8-15
Columbus, Ohio, Auto-Plane	Feb. 9-13
New York, American Legion, Aviation	Feb. 9-15
Denver Automobile	Feb. 10-15
Indianapolis, Automobile	Feb. 10-15
Sheboygan, Automobile	Feb. 10-16
Mankato, Automobile	Feb. 12-15
Black Hills, S. D., Automobile	Feb. 12-15
Peoria, Automobile	Feb. 12-16
Providence, Automobile	Feb. 14-22
Canton, Automobile	Feb. 15-22
St. Louis, International Aircraft	Feb. 15-23
Omaha, Automobile	Feb. 17-22
Copenhagen, Automobile	Feb. 21
Los Angeles, Automobile	Feb. 22-March 2
Camden, N. J., Automobile	Feb. 24-Mar. 1
Des Moines, Automobile	Feb. 24-Mar. 1
Seattle, Wash., Automobile	Feb. 25-Mar. 2
Detroit (All-American Aircraft)	April 5-13
Asbury Park, N. J., Automobile	April 7-12

CONVENTIONS

American Institute Electrical Engineers.
New York

National Automobile Dealers Association, Chicago

Ohio Assn. of Commercial Haulers, Cleveland

Southwest Road Show and School, Wichita

American Society for Testing Materials, Regional Meeting, Detroit

American Society Mechanical Engineers, Fiftieth Anniversary Celebration: New York

Hoboken, N. J.

Washington, D. C.

National Foreign Trade Conference, Los Angeles,

World Power Conference, Berlin

Railway Supply Mfrs. Assn., Meeting and Exhibit, Atlantic City

American Railway Association, San Francisco

American Society for Testing Materials, Annual Meeting, Atlantic City

SALONS

Hotel Biltmore, Los Angeles

Palace Hotel, San Francisco,